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WE give in our News Section the programme adopted by the joint committee on arrangements for entertainment in connection with the conventions of the Master Mechanics' and Master Car Builders' Associations at Atlantic City, June 12-19, inclusive. Secretary Taylor's letter, in which the programme is sent out, suggests two thoughts. The first is that the mechanical associations are trying to get not only their conventions, but also everything connected with them, on a basis where they cannot be justly criticised. In the past the Railway Supply Manufacturers' Association has borne all the expense of the entertainment features. This year the expense is divided between the railway associations and the supply men's association. Furthermore, the entertainment programme has been radically changed so that there will be less formal and more informal features. There has been complaint that the formal entertainment features of past years have caused a rivalry in expenditure for dress, etc., which to many was both excessively costly and embarrassing. It is expected that the greater informality of this year's entertainment features will make them immune from this criticism. The second thought that a glance over the programme suggests is that the impression which many seem to have been given that there is to be almost no entertainment, and that therefore the conventions and the events associated with them will be of interest only to those who care exclusively for the technical reports and discussions and the exhibit of railway supplies, is quite wrong. There will be plenty of opportunity for inexpensive amusement for all those who in past years have attended the conventions; and those having in charge the arrangements hope and expect that the attendance not only of members of the associations, but also of their families, will be as large as usual. It is also hoped that there will be an increased attendance of operating executive officers.

MR. DELANO has seldom been an alarmist or a pessimist regarding railway conditions. Some of his utterances regarding railway regulation—notably in reference to the decisions in the rate advance cases—have been much more optimistic than the views held and expressed by most railway officers. His natural mental attitude is fair and judicial. When a man of his optimistic and judicial temperament speaks in alarming and pessimistic tones, as he did at Detroit on Wednesday night, railway men, shippers, regulating authorities and the public may well take note of his remarks. Doubtless, it will be said that the opinions he voiced were largely shaped by the fact that he has recently, after years of struggle to avert that result, seen his own road go into bankruptcy. But Mr. Delano is not the kind of a man who judges of the entire railway situation by the condition of one road. Those who investigate will reach the same conclusion that he has, namely, that the conditions on some roads are bad, and that on many other roads they certainly are far from good. The railways have been beset with increases in operating expenses due to increases in wages and the cost of materials and to various forms of government regulation; by increases in the rate of interest; by a winter almost unprecedented for extreme cold and heavy snows; and many of them, finally, by extensive floods. The cold, snow and floods, which have increased operating expenses, have also reduced traffic and earnings. The margin between gross earnings and operating expenses on a railway may be large in absolute amount, and yet so small in proportion that a comparatively small reduction in earnings or increase in expenses will create a dire situation. The various conditions mentioned have put a good many roads where if there should be a large and sudden increase in their business they would be incapable of handling it. The commercial associations of Michigan, whom Mr. Delano addressed, have raised the question, What is the matter with the railways? One of the main things the matter with them is that the people of the United States have been using a minimum of horse sense and a maximum of power in regulating them; and one remedy for the situation is the exercise for the public for some time to come of less authority and more sense.

THE Railway Tax Men's Association, which was organized at Chicago recently as a national association of tax officials and attorneys, should be able to perform a useful function not only in the interest of the railways but for the benefit of the public at large. That it has a wide field in which to work is indicated merely by a consideration of the multiplicity of intricate problems continually arising in the relations between railways and the various local taxing bodies with which they have to deal. The most important of these problems, as outlined in the stated objects of the association, are to devise accurate and adequate methods of determining the assessable value of railway property and its relation to the assessment of general property, and in the case of the interstate roads to devise methods for apportioning the ascertained value of railway property to the different states and lesser taxing districts. It will be the endeavor of the association to assist as much as possible in the formulation of "a uniform, simple, efficient and equitable system of railway taxation throughout the country." The complications in which taxation problems are involved are greatly increased by varying laws and ideas which govern the state and local taxing authorities. There are now 24 state tax commissions, all of which vary more or less in their requirements as to the forms in which railways shall make their returns for taxation purposes and the principles which shall govern; and where specific requirements are not made by the authorities different railways are likely to present returns to the same bodies based on entirely different principles. Wide variations are also common in the relations accepted in different localities between the values of railway and other property. All of these considerations demand more uniformity in the method of making returns, and the increasing demand for physical valuation of railways for rate-making as well as for taxation purposes opens a wide field in which the concentrated experience and knowledge of the railway tax experts can be of the greatest aid in the effort to formulate definite and equitable principles to be applied.

DID you ever watch a passing freight train or walk by a long string of box cars and notice the doors? If you have not, take the first opportunity of so doing and it will possibly be a revelation to you. Box cars are expected to be used interchangeably for transporting merchandise, and yet if flour or grain or any other material, which will be injured by moisture and cinders, is to be carried, it is either necessary to make a special investigation to secure cars with doors and roofs which are cinder and water proof, or else it is necessary to take chances on the goods being delivered before a storm is encountered. Box car doors will be found in every imaginable condition, a few of them being well secured and fastened, while by far the greater proportion are either warped or hang too loose, or are otherwise defective, some of them so much so that they will be found patched up in various ways, or may even be nailed to the car. The lack of proper bracing and the use of inferior fixtures may not be noticeable when the car is first turned out of the shop and goes into service, but it soon becomes apparent and the increased maintenance cost quickly eats up the difference between the cost of a good door and that of a poor one. An article on another page of this issue calls attention to some of the more important defects in box car doors and suggests remedies. A similar article last week directed attention to the ease with which many box car doors may be opened, allowing the car to be robbed without breaking the seal or leaving evidence of its having been entered. The loss due to defective doors, both because of damage to and loss of freight and the increased cost of maintenance, is so large that radical steps should be taken to overcome it. So important is this question of building box cars to properly protect the lading and thus eliminate freight claims chargeable to defective equipment that the American Railway Association could well afford to adopt the suggestion in our issue of April 12 to the effect that a bureau be inaugurated under the direction of that association to see that all new cars are properly designed and constructed from the standpoint of loss and damage to freight, and that provision also be made for adapting the cars now in service to give more satisfactory service in this respect.

THE QUALITY OF AIR BRAKE HOSE.

THE use of inferior air brake hose on freight cars in interchange is responsible for numerous expensive delays and accidents, and, though a matter of long standing, the improvements in the M. C. B. specifications for this material and its inspection have not made conditions better, but they appear to be growing worse. The increasing use of rubber goods has caused such a demand for pure rubber that its price has advanced so as to encourage the extensive use of substitutes, adulterants and fillers; and experience with these has resulted in the production of a material for hose which will meet specifications for strength and elasticity when new, but which depreciates rapidly and has a short life.

The statistics relating to the average life of hose are complicated by the fact that gradual depreciation, due to the quality of the rubber and the way it is made, is not entirely separated from the failure of hose due to mechanical abuse. Investigations made several years ago demonstrated that 65 to 70 per cent. of the hose failed from damage due to mechanical abrasion or blows, and 95 per cent. of this occurs at the nipple end. Part of this destruction originates from external causes, and a large part—probably 15 per cent.—from internal puncture when mounting. About 10 per cent. of the air brake hose is injured by pulling apart when trains separate with couplers closed.

More recent investigations have shown that the bursting at the nipple end is often due to the puncture of the inner tube while forcing on the nipple with machines operated by air cylinders. The hose is forced on under heavy pressure when it is not in line with the axis of the nipple, and the edge of the latter cuts into the rubber tube and weakens the hose at that point. When in service under pressure the air escapes through the puncture and is gradually forced through the different layers until the outer tube is ruptured locally and it is no longer good for service. The machine might be improved so that the hose would be kept in true alinement when the fixture is mounted, but some of the larger lines are now having the work done by hand, so as to avoid this wholesale abuse of the hose.

The mechanical injury to air brake hose is so extensive that when added to the fact that inferior rubber is used in its manufacture, the average age of the hose is only about 8 months, while the normal life of good hose should be two or three years. This short life is so largely due to influences entirely apart from the quality of the rubber that railways have concluded that it is extravagant to pay a high price for high grade hose when it will be destroyed by carelessness or abuse of some kind within the year, and that a less expensive grade would render an equal service. This reasoning carried to the extreme has resulted in less rigid inspection, a gradual deterioration in the quality of the hose and the purchase by a few railways of hose which does not meet M. C. B. specifications when new, in order to save the slight amount due to the lower price.

The inferior quality of air brake hose is due to cheap methods of manufacture as well as to low grade stock in the rubber tubes. The M. C. B. specifications require the tube to be hand made and composed of three calendars of rubber, and very little air brake hose is made in this way. The object of the three layers is to cover up small holes in one sheet by a solid layer in the other sheets and thus produce a tube which will not leak. This method of making the tube by the use of three calendars adds to the expense, and few inspectors go to the trouble of ascertaining whether they are getting hose made in that way. The simplest remedy would be to inspect general methods of manufacture at the factory where a uniform and continuous practice can be depended on. It has been suggested that the middle layer of the three calendars be colored so that when a

section of it is cut through the three layers will be indicated by the different colors.

As such a large proportion of air brake hose is made with a single layer tube, and much of it is sound enough to resist train pipe pressure, it is a question whether the three calendars should be retained in the specifications, as it only tends to lower the respect due to other requirements if any of them, even the more essential, are habitually disregarded. But a very small proportion of the leakage in the train pipe system is due to the porosity of the hose, and the majority of it comes from leaky gaskets and pipe joints.

The quality of the rubber in the tube, whether it is solid or calendared, is the most important factor and the most difficult to guard so as to insure a proper grade and one which will not rapidly deteriorate after inspection. The price-lists of natural gums or rubbers include grades which sell as low as 25 cents per lb., while the best Para rubber is now quoted at $1.25 per lb.; so there is a wide range in the grades of the natural rubber from which to select the stock for air brake hose. The low-priced rubbers are so full of bark, earth and other impurities as to be unsuitable for a rubber exposed to pressure. Some of the by-products from the glucose factories were formerly used as fillers, but this is a dead and weak material which must affect the strength of the product if used in any large proportion. Reclaimed stock from old hose, tires, gum shoes, etc., is of varying quality, depending on the grade of rubber originally used, and this finds its way into the mixture for air brake hose.

During the past five or six years guayule has been used extensively in rubber manufacture, and its use has done more to depreciate the quality of rubber used for air brake hose than that of any other substance. It is made from a weed which grows in Colorado and Mexico, and has many of the qualities of natural rubber, but it fails more particularly in durability. When first introduced it sold as low as 25 cents per lb., but the demand for it has been so great that the price has advanced to 80 and 90 cents. Hose made with guayule as the principal ingredient will meet the M. C. B. specifications as to strength and elasticity when new, but it rapidly depreciates, and in a month or two, and after a short exposure to the weather, it is rendered unfit for air brake purposes. To guard against the use of this inferior hose it ought to be possible to arrange for a test of seasoned stock, or to exact some guaranty of strength in samples tested after several months' exposure.

The current price of air brake hose made from good rubber and which will meet the principal requirements of the M. C. B. specifications is 36 to 40 cents per foot, while inferior grades sell at 30 cents or less per foot, and bear labels stamped M. C. B. standard with the name of the maker. The use of this label has done much to discourage the use of hose made of inferior rubber, and it should be possible to segregate the makers who are willing to risk the use of their names on such material. The difficulties of inspection of air brake hose in interchange render it hard to condemn the inferior hose unless it exhibits a mechanical defect, but the names of makers who are known to make poor hose and sell it at a low price should render their product open to suspicion and I encourage special inspection whenever possible. Federal inspection of safety appliances could be extended to air brake hose and require it to be strictly M. C. B. standard, and it may be necessary for the railways which use good hose, and are willing to pay the standard price for it, to request the protection of federal authority against those lines which deliberately buy inferior hose and place it on their neighbor's cars.

Good hose is not always secured where the standard price is paid, on account of poor inspection. Some railways pay inspectors low wages and it is not surprising if the quality of the work proves poor in proportion. A testing department under the direction of the railway mechanical associations has been frequently suggested, and the testing of air brake hose for the railways would furnish profitable occupation for a portion of the time of such a bureau. If the railways do not take proper measures for securing good hose on all cars in interchange they will invite a further extension of the sort of public regulation which they so much deprecate.

THE MUCKRAKER, THE RAILWAYS AND THE COURTS.

EVERYBODY'S MAGAZINE recently has been publishing a series of articles by C. P. Connolly entitled, "Big Business and the Bench." Thus far the articles have been devoted mainly to an attempt to show that the railways influence, or even dictate, the election and appointment of many judges, and that these judges, either from motives of gratitude to their corporate creators, or because of improper influence brought to bear on them during their incumbency, have been systematically interpreting the various constitutions and statutes, so as to give to the roads an unfair advantage over other litigants, and especially over their employees who bring suits against them for personal injuries or on other grounds. Mr. Connolly attempts to support his generalization that "there is a railway sidetrack leading into the courtroom and that a locomotive blocks the door of justice," by citing a rather scanty number of specific examples of decisions in railway cases and generally embroidering them with the sort of cheap attempt at breezy comment which has made the Charles Edward Russell-Lincoln Steffens school of writers more or less famous; they all write according to the same formula. The scientist, no less than the logician, has taught us for long the danger of basing sweeping generalizations on one or a few facts, however indisputable the facts may be. When the facts are not only few, but also disputable, the dangers of this kind of ratiocination are much more serious. Yet Mr. Connolly, like the entire modern school of muckrakers, takes a few incidents, the facts as to every one of which are open to controversy, and erects on them a gigantic inverted pyramid of innuendo regarding the railways and the courts. He implies that the courts generally are now subject to corrupt influence by the railways, and yet he does not give a single instance indicating the existence of the state of affairs he describes. All of the examples he uses to substantiate his statements as to contemporary conditions are taken from the history of past years.

One of them is a case in which, as is alleged, M. J. Gordon, an attorney for the Great Northern in Washington, and a former chief justice of the supreme court of that state, prepared an opinion in a proceeding against the Great Northern and got the supreme court to substitute it for an opinion already prepared, the effect being, as is asserted, to change the law as previously laid down by the court. The *Railway Age Gazette* knows nothing about the facts in this case, but it is notable that, although cited as "typical" of what is going on now, the alleged incident happened three years ago, and was cited as an example of judicial corruption in *Collier's Weekly* on July 10, 1909; and by Carl S. Vrooman in his book "American Railway Problems," published in 1910. Does not the very fact that all the muckrakers use this one case as typical show that it is not so at all, but exceptional? For it is not true, as the old adage says, that the exception proves the rule, but quite the contrary.

Very much more light is thrown on the nature of the "typical" instances cited by Mr. Connolly by consideration of the case of *Oglesby* v. *Missouri Pacific Railroad Company*, which he describes at length to show alleged conditions in Missouri. Mr. Oglesby, who is now chairman of the Missouri railway commission, was formerly a brakeman on the Missouri Pacific, and lost a leg in an accident in 1892. He sued the road and got a judgment in the lower court for $15,000. The case was appealed and the Missouri supreme court remanded it for a new trial. Again in the lower court Oglesby was successful; again the case was appealed, and this time the court completely reversed the decision. This was during the period when Col. "Bill" Phelps was the lobbyist of the Missouri Pacific at the state capital and the champion pass distributor of the railways of Missouri. In

these capacities he was a very influential man in Missouri politics. Mr. Connolly implies that it was the corrupt influence of the railways, and particularly of the Missouri Pacific, that prevented Oglesby from finally winning his case. The *Railway Age Gazette* happens, for reasons that need not be stated, to be peculiarly familiar with the conditions existing in Missouri at that time; and it is true that the railways then ran and corrupted the politics of the state. But the implication of Mr. Connolly that the supreme court was dominated, and was known by those then living in Missouri to be dominated, by the railways, is absolutely false; and every man who was then in close touch with public affairs in that state knows it.

Law Notes, a legal publication, in its issue for April, 1912, presented facts which indicate why no such impression obtained, and why it should not have obtained, and which show that at the time of the decision in the Oglesby case the Missouri supreme court was very far from being unduly influenced by the railways. If it had been dominated by them we should doubtless find that at the same terms at which the Oglesby case was heard decision in other railway cases would also have reflected the situation. What are the facts? *Law Notes* states them as follows:

"In the first place, the decision of the supreme court in the case of *Oglesby* v. *Missouri Pacific R. Co.*, a personal injury case, reported on the first appeal in 150 Mo., 137, and on the second appeal in 177 Mo., 272, is attacked by the writer. For the present purpose we will assume, without admitting, that the court erred on both appeals in reversing a judgment for the plaintiff, and will content ourselves with noting the fact that on the first appeal the court stood as follows: Three judges for affirmance, two for reversal and remanding for a new trial, and two for reversal without remanding, the latter two eventually agreeing to a reversal and remanding in order to dispose of the case. On the second appeal the court stood four for reversal and three for affirmance. Now, what do the volumes of the reports in which the Oglesby case is reported show? In 150 Mo. there are reported, exclusive of the Oglesby case, four cases against railway companies, which were disposed of as follows: *Corby* v. *Chicago, Rock Island & Pacific R. Co.*, p. 457—suit to enjoin defendant from building side track—judgment for plaintiff affirmed, all concurring; *St. Louis* v. *Kansas City R. Co.*, p. 453—condemnation proceedings—assessment of defendant's damages at $5,500 affirmed on railway's appeal, all concurring; *Sweeney* v. *Kansas City Cable R. Co.*, p. 385—action for negligence—judgment for $5,000 affirmed, all concurring; *Hogan et al* v. *Citizens' R. Co.*, p. 36—action for negligence—verdict of jury for defendant and judgment entered thereon affirmed, all concurring. In 177 Mo. there are reported, exclusive of the Oglesby case, three cases against railway companies, which were disposed of as follows: *Holden* v. *Missouri R. Co.*, p. 456—action for negligence—order granting plaintiff a new trial, after peremptory instruction to find for defendant, affirmed, all concurring; *Western Sash & Door Co.* v. *Chicago, Rock Island & Pacific R. Co.*, p. 641—action for damages to freight—judgment for plaintiff affirmed, all concurring; *McGrew* v. *Missouri Pacific R. Co.*, p. 533—action to recover penalty for making illegal freight charges—judgment sustaining demurrer to petition reversed, all concurring. So, out of seven cases reported in the two volumes of Missouri reports in which the Oglesby case is reported, in all but one case the railway company was unsuccessful on appeal to the supreme court which the writer in *Everybody's* denounces as a railway court, and in the case in which the railway was successful *a jury* had determined that the plaintiff was not entitled to recover."

Does it seem probable that out of eight decisions at these two terms the court would have rendered six against the railways and only two for them if it had been railway ridden, as is charged? This muckraker has done just what those of his class habitually do; viz., picked from a record of eight cases the particular one that seemed to serve his purpose, built his generalizations upon it and utterly ignored seven other cases, all of which were equally in point.

In the same article Mr. Connolly, to show the depths to which the supreme court of Missouri had sunk, cited an instance where one of its judges incorporated in a "decision" a budget of statistics prepared by railway agents which had not been introduced as evidence in the case. The case referred to was *Murphy* v. *Wabash Railroad Company*, 228 Mo., 109; and *Law Notes* shows that the matter to which Mr. Connolly refers appeared, not in the majority opinion, but in the *dissenting opinion* of Woodson, J., and that the *decision* of the court was against the railway and affirmed a judgment for $8,000 in favor of the representatives of a person who had been killed in a railway accident. In other words, Mr. Connolly deliberately or ignorantly falsified the record and conveyed to his readers a wholly erroneous impression.

The foregoing facts regarding some of the cases cited to show the corruption of the courts indicate how much reliance may be placed on Mr. Connolly's statements. It will be noted, in passing, that the Oglesby case and the case of *Murphy* v. *Wabash Railroad Company* are, like the Gordon case, ancient and not modern instances. The Oglesby case was finally decided nine years ago; there has since been a political revolution in Missouri, several changes in the personnel of the court, and important legislation and decisions modifying the law of master and servant.

By a coincidence, at the very time that Mr. Connolly's series of articles, which are intended to show that the railways own the courts, are coming out, there has been published a document which demonstrates that in personal injury cases the roads have usually found it more to their interest to make voluntary settlements than to trust to the determination of judges and juries. We refer to the report of the federal Employer's Liability and Workmen's Compensation Commission. In an appendix to this report are given statistics regarding the experience of railways having one-half the mileage in the United States, and the tables presented show that on the average the judgments for damages that have been rendered against the roads have been twice as large as the amounts that they have had to pay when they have made voluntary settlements. If the railways had owned the courts it seems hardly probable that they would have used them for the purpose of mulcting themselves in twice as great damages as they have had to pay when they made voluntary settlements.

The *Railway Age Gazette* a short time ago analyzed the statement about railway accidents made by Charles Edward Russell in an article entitled "Speed," published in the *Hampton-Columbian Magazine*. (See *Railway Age Gazette*, December 8, 1911, page 1166; January 19, 1912, page 80; March 8, 1912, page 412.) We showed in an article and two editorials commenting on Mr. Russell's article that there was hardly a statement in it that was true, and that even most of those statements that were true were made in such a way as to convey a false impression. The facts that we have cited in regard to Mr. Connolly's article show that this writer and his articles are in the same class with Mr. Russell and his articles. *Everybody's Magazine* touts him as an "able lawyer," "a trained investigator," etc. The muckraking magazines have a happy way of handing to persons nobody else ever before heard of a volume of the decisions of the supreme court, a volume of the statistics of the Interstate Commerce Commission, a formula for writing a la Charles Edward Russell, and thereby apotheosizing them into "great lawyers" and "eminent authorities on railway affairs." But when it comes to dealing with facts, these "great authorities" are all alike. Every incident, however exceptional, which can be tortured into such shape as to make a narrative that will reflect on the honor, the honesty, the capability of any public official, judge or business man, who does not believe that everything in American business and political life is rotten and should be extirpated, is meat for their sausage mills.

The lobbyists used to make their money—and some of them do yet—by one class of corrupt methods. The muckrakers are making their money by another class of equally vicious methods—methods which are adapted and seem intended to mislead and corrupt public opinion. In a famous speech when he was in the heyday of his political prosperity, "Bill" Phelps said: "Stone and I both suck eggs, but he hides the shells." (The Stone referred to is William J. Stone, now a United States senator from Missouri.) The muckrakers, unlike "Bill" Phelps, embalm all their calumnies of American business and political institutions with the hypocritical pretense that they are written solely to further the public good. But decent and intelligent people long since learned how to gage such pretensions when associated with such methods; and the time will come when the American public generally will see that those two thirty-third degree hypocrites, Tartuffe and Pecksniff, were sincere and simple-minded gentlemen compared with the members of the modern fraternity of muckrakers.

NEW BOOKS.

Comparative Analysis of Railroad Reports for the year ended June 30, 1911. New York: H. H. Copeland & Son. A series of ten charts, covering 150 roads. Price, $100 for the set; single charts, $15 each.

Moody's Analysis of Railroad Investments. Edition of 1912. By John Moody. New York: Analyses Publishing Co., 35 Nassau street. Cloth, 11½ in. x 9 in.; 636 pages. Price, $12.

These two statistical works, while very different in method of preparation and scope, are both important aids to bankers or railway statisticians in helping to give some real meaning to the mass of figures which railways are required to report to the Interstate Commerce Commission. Neither of these works can be properly made use of without a considerable knowledge of railway statistics and statistical methods. The Moody book, however, contains an introductory essay on the art of selecting investments, and gives in a quite readable and fairly simple form the principles which should guide an investor in making a study of different classes of railway issues. To make the fullest use of the book one should thoroughly understand all the principles laid down in the introduction; but for the benefit of private investors, a great majority of whom do not understand these principles thoroughly enough to depend on their own ability to analyze the security and probable future value of railway bonds and stocks, Mr. Moody in the body of the work rates each issue according to his own judgment and his analysis of its position. All of the important railway companies are given a chapter of analysis in which are shown the physical factors; a ten year average comparison with four properties in similar territory; earnings and their distribution per mile of road, and a comparison with similar properties; capitalization; the bond record and bond rating; and the stock record and stock rating. The banker or statistician can therefore draw his own conclusions from the figures which are given, while the layman can get the benefit of Mr. Moody's conclusions from the analysis. Bonds are rated from A a a down to D and E. For instance, Lake Shore & Michigan Southern first and refunding 4s are rated A, and Wabash first and extension 4s are rated D. Stocks are rated in the same way, although, of course, a stock which is rated A a a is not comparable as an investment to a bond that is rated A a a, because of the difference in the class of investment. The rating, either of bonds or stocks, of course, is arbitrary, but from what one can judge by a superficial examination, Mr. Moody has used good judgment in his rating and has apparently been conservative.

The Copeland analysis of railway reports is not intended at all for the use of the layman who is unfamiliar with railway statistics. Its appeal is to the banker dealing in railway securities and to the higher railway officer. Each chart is divided into two parts, and each chart gives a showing for 15 roads, so that in all 150 roads are comprised in the series. The first part of each chart makes an analysis of income, of expenditures and of profit and loss for each one of the 15 roads for the fiscal year ended June 30, 1911. No comparison is given with the figures for the previous year. The total figures for the road are given; they are then averaged per mile of road operated, per revenue train mile, and per ton and per passenger mile; and expenditures are shown on a unit basis wherever this is possible. The figures are taken from the returns made by the roads to the Interstate Commerce Commission, and so far as can be judged, the analysis is carefully and intelligently made. Things are compared which can be compared, and in general no attempt is made to compare things which are not comparable. The different roads that are put on one chart are selected, so far as is possible, so as to form groups, all of the roads in which, have somewhat similar operating conditions, so that unit statistics as between these roads may roughly be compared. These charts have been published for two or three years, but the present edition is a considerably more complete and comprehensive analysis than has ever been made before. This year for the first time the figures for all the roads in each group are combined and the averages are shown for the group. These averages, if careful allowances are made, are of considerable value in checking up the showing made by any one road in a group. The second section of the chart gives an analysis of the balance sheet, capital changes and physical statistics of the 15 roads. There are a number of figures shown which are not reported in the annual reports which the roads make to their stockholders, and this additional information makes the charts of great value to bankers and to railway officers.

Both of these works are well worth a place in any comprehensive statistical library.

Railway Transportation. By Charles Lee Raper, Professor of Economics, Dean of the Graduate School, University of North Carolina. George P. Putnam's Sons, New York. Cloth, 5½ in. x 8½ in. 330 pages. Price, $1.50 net.

Prof. Raper's book will at once take rank among standard authorities. The author states that it is based on President A. T. Hadley's "Railroad Transportation," and the views expressed on railway economics are very similar to those of Dr. Hadley. But, as a matter of fact, they are no more similar to Dr. Hadley's than they are to those of that large majority of authorities on railway economics, who agree with Dr. Hadley, and Prof. Raper's volume is anything but a slavish imitation of that of Dr. Hadley.

The first chapter is devoted to a brief history and general discussion of modern transportation. Succeeding chapters take up in turn railway transportation in Great Britain, France, Italy, Germany and the United States; and contains a large amount of up-to-date and valuable statistics and information regarding the organization, rates, service, financial return, etc., of the railways of these countries. The last chapter is a study of "State Operation of Railways," based especially on the experience of Belgium, Austria, Italy, France and Germany.

Prof. Raper has a clear, direct, interesting style, and his work indicates very extensive reading. He has also traveled over the railway systems of various countries, studying them at first hand. He is an advocate of the use of the principles of both cost of service and value of service in rate making. He thinks state railways tend to put too much stress on cost of service, and in consequence make their rates inelastic and ill-adapted to the development of commerce and industry; and he cites numerous examples of such rate-making on government-owned lines. On the other hand, he thinks the cost of the service should in future play a greater part in rate making in the United States than it has in the past.

His investigations lead him to the conclusion that few, if any, state railways, have been successful financially, but those of Germany, and that the financial success of the German roads is exaggerated. He finds, also that ordinarily the service under state operation is not apt to be as good under private ownership, naturally, he comes to the conclusion that public ownership is not the most expedient policy, especially in a democratic country, such as the United States, where the votes of railway employees would be such a large factor in elections, and where we have not developed the sort of government that makes possible such success as the Germans have attained in the operation of their railways.

Prof. Raper's book has one marked shortcoming that should be mentioned. He constantly uses the operating ratios of the railways of different countries as almost conclusive tests of the efficiency with which they are managed. The operating ratio of a railway depends on the amount of its rates and on many other factors that have no relation to the efficiency with which it is managed, and should not therefore be used as Prof. Raper uses it, except very guardedly and with many qualifications. But in spite of some such shortcomings the book is a really admirable one, and should be in the library of every person who is interested in its subject.

The congress of Chile has recently passed a law, which has been approved by the president, creating the new department of railways in charge of the ministry of industry and public works.

Letters to the Editor.

"THE RAILWAY LABOR SITUATION," AS VIEWED BY AN EMPLOYEE.

SALT LAKE CITY, Utah, March 22, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Your series of papers on "The Railway Labor Situation" is well timed, and outlines a situation that calls for serious consideration; just how serious may be conjectured from the ineffectual efforts of some of the most clever railway men in this country towards its solution. Its very complexity is its danger.

Referring to your fourth paper on this subject (*Railway Age Gazette*, March 15, page 464) we find in the letter from Mr. Delano, a practical suggestion for arbitration and yet not acceptable if it should be compulsory. The late Mr. Melcher, in his comment on Mr. Delano's letter, went right to the point, and still left the problem unsolved. The "case" simply goes back to the court of public opinion, and the verdict, "influenced" by the public convenience to the harm of one side or the other, is still open to contention and bitter resentment. In groping through this problem we are going about in circles, for when the employee returns with further requests we have established no logical methods or precedent, and we again run a gauntlet of strikes and lockouts and other customs peculiar to the dark ages. Where does this lead to? What is the solution?

Speaking for the employees collectively, I may say they only desire a fair consideration, and the observance of their agreements. For the railways we may say the same. Then where is the common ground, the stable rule to compute from?

When the Supreme Court, in the Standard Oil decision, took high ground and announced the "rule of reason," it did not settle the trust problem, but it defined a common point where sensible people may get together and agree to recognize each other's rights, and observe their agreements without detriment to others.

The court compromised and deferred.

I may say, without doubt, the most prolific source of friction and conflict between railway and employee is the violation in spirit, and often in letter, of the wage and working agreement. The monetary loss is as nothing when compared to the demoralizing effect upon the men. Its effect is all bad. Without attempting to excuse an unreasonable employee, there is nothing in my estimation, that will excuse or justify the going behind the agreement, on various pretexts, with a net loss to the men in wages or favorable conditions. All the good effects of the favorable settlement are nullified and only the good influence of some clever official and a "patching up" by the local committee will prevent a second outbreak. Then what becomes of that effort towards friendly relations?

If I am not mistaken as to the trend of present and prospective legislation, our friend, the public, will soon take in hand the solution of our "railway labor situation." The danger of it will not deter the public, so let us hope for the best.

Referring to a suggestion by "D. A. D." for a combination of train and engine service, I am much impressed with its possibilities. If every man on the train, available and in service as fireman or brakeman, conductor or engineman, could change about as the company's convenience might warrant, being subject to call in either service and required to pass a standard examination on train rules, orders, and change of card, machinery, airbrakes and block signal, and with uniform salary and uniform responsibility—except, of course, the student, who comes in as apprentice—nearly always the crew would be "fullfledged." Efficient service would be the word. I wonder do the railways appreciate "D. A. D."? A dreamer and theorist he may be, but he is a constructive thinker, and a daring apostle of progress. At the head of a government department or railways he would revolutionize the business. What an opportunity for him!

Continuing along the lines of the above suggestion by "D. A. D." the arrangement, as outlined, would certainly result in more efficient service. There would be more stability to the men, there being a better understanding, and more interest in the work. These two small branches of the service should really be one, with all of the men available for either train or engine board. The trainman of several years' experience, when he has passed a satisfactory examination on machinery, will make a capable engineman. The two "lines" would finally merge. "D. A. D." has made many clever suggestions. For instance, that for pay of train and enginemen by the hour, with a proviso for a minimum day. This method, properly installed, would simplify many of the vexing wage problems.

I assume your purpose in your editorials on "The Railway Labor Situation" to be a better understanding between company and men. As this would naturally precede any wage agreement. I may safely say, excepting a few individuals, the men are well disposed on wage agreements. They are sometimes unreasonable on interpretations of some particular portions of their agreement, but that is usually an honest difference of opinion, to be adjusted, mutually. The unreasonable employee is in the minority and must be overruled.

In regard to the assertions and views of "Nutlock," in your issue of March 15, I may say, there is no disposition on the part of the employee to find excuse or defense for the careless and negligent workman. Brother Nutlock severely arraigns the Interstate Commerce Commission and a labor journal for their efforts for the correction of a threatening condition in the service. Publicity for the facts seems the natural remedy. Controversy between the railways and the steel trust over rail contents and treatment and a few more rail failures, will result in a government standard. Reasoning along these lines, the publicity of the "gross carelessness" of the workman, so desired by "Nutlock," will inevitably bring that final remedy, the automatic train control appliances, with absolute "block" for front and rear. I think we may all say, "Speed the day." But are the railways prepared for such legislation?

The *Railway Age Gazette* is covering its chosen field in a most thorough and efficient manner, and its efforts toward the solution of the labor problem are further assurance of good faith. May the good work continue.

WILLIAM J. TIERNEY,
Secretary, General Committee, Order of Railway Conductors,
San Pedro, Los Angeles & Salt Lake.

The work on the railway across the Brazilian-Uruguayan frontier between the cities of Santa Anna do Livramento in Brazil and Rivera in Uruguay, has been completed. This will allow passengers and freight to be transported from one country to the other without change, as it connects the railway systems of the two republics which are already in operation.

The Paloma to San Marcos railway, Chile, has been completed, and work on the Choapa to Salamanca railway has been temporarily suspended. On the Copiapo to Lagunas railway rails have been laid for a distance of 108 miles, and a complete survey of the Serena to Copiapo railway and the staking of the line for a distance of 186 miles have been made, while the Vallenar to Algarrobal railway, which is to be included in the same railway system, will be completed in the near future.

A serious study has been given to the project of constructing a railway as a prolongation of the system of the Central of Brazil from a point near the station at Pirapora, in the state of Minas Geraes, almost due northward across the interior of Brazil to the city of Para at the mouth of the Amazon river. This will be substantially a trunk line connection between the north and south, making no detour to reach the seaports. These can, however, be joined to the through line by branches, thus placing the seaboard and the interior in close touch with each other and with the capital, Rio de Janeiro. The entire distance in a straight line may be about 1,900 miles, and the new lands to be opened are highly productive, suitable to colonization, and of great future economic value.

WHAT IS THE MATTER WITH THE RAILWAYS?*

National Policy of Country Seems to Be to Reduce Them to Starvation. Criticism of Regulation and Labor Unionism.

BY F. A. DELANO,

President and Receiver, Wabash Railroad.

Business men and prominent manufacturers of Michigan have met together in convention, to ask the question, "What is the matter with the railways?" I am here today, by invitation, to give an answer to this question as I see it.

Most railway men would like to reply that the railways are *all right;* that they neither need your help nor your sympathy; but the fact of the matter is that they are not all right, and that the national policy of this country seems to be to reduce them to starvation. In any starvation process, of course, it is obvious that those with ample resources will survive a good deal longer than those that are poor. This is no less true of railways than of individuals. In this connection it would be amusing, if it were not so sad, to see the frequent references in the public prints, magazines, etc., to the carelessness of railway managers in letting their property run down. It is said, with a great show of wisdom, that the railways should put their property in splendid condition during the summer, repair all their locomotives and cars, so as to be in good condition to go through the winter. Unfortunately, the railway manager with interest charges and a payroll to meet must "cut his garment according to the cloth." Many of them have shown uncommon resourcefulness in getting along under uncommonly difficult conditions, but when all facilities have been strained to the utmost, and on top of that we have a winter like the one just past, a complete collapse ensues, and the demoralization is sometimes so great that the public marvels at the utter lack of foresight on the part of the railway officials.

I do not claim that railway officials are more far-seeing or wiser than the rank and file of men who manage the commercial, mercantile and manufacturing business of the country. I do contend that they average up with the rest. They come from the same general stock, and their education—whether in book-learning or in the school of hard knocks—is equal to that of other men. So far as I know, they work just as hard. It is only fair to assume that they are fully up to the average of intelligence.

No one has to tell a railway man that if he doesn't put his motive power in good condition, he is bound to suffer when bad weather comes, or when he has a rush of business. He knows that perfectly well. The inevitable question with him always is, "Where is the money coming from?" If he doesn't make a good showing in low operating expenses and a safe margin between expenses and earnings, his *credit* suffers and he can't borrow any more money to buy new cars and engines The constant question with every railway manager is how close he can cut his expenses and still not go beyond the danger line of a safe reserve. If last winter had been a normal winter, or, like some of the winters we have had recently, abnormally mild, most of the railways in the country would have come through quite comfortably. It so happened that it was an abnormally bad winter, and, therefore, even roads that were well equipped suffered seriously. Indeed, it is a remarkable thing which most railway men fully appreciate, that the margin is very narrow between close and successful operation on the one hand, and overloaded facilities, with demoralized operation, on the other.

RAILWAY REGULATIONS.

Most thinking men today, whether in railway service or not, are convinced that the regulation of public service corporations, including the railways, is necessary and desirable. The only difference of opinion is as to *how far* this regulation should go. In the last few months the shippers of the country have suffered severely from the failure of the railways to furnish prompt and adequate facilities; and I understand the object of this convention is to consider, in a frank and free discussion, what the causes of that failure have been.

In my humble opinion, the causes—stated in a few words—are these: First, that the railways have been starved by reductions in rates, and by increases in taxes, wages and cost of materials, to a point where the margin between income and outgo has diminished to an alarming extent. Even the strongest and most fortunately located railways of the country have suffered a serious shrinkage in net earnings, and their credit has thereby been impaired, whereas, weaker and less fortunate roads have been pushed to the wall.

The effect of this has been that the railways have done just what any individual or corporation would do: They have had to skimp wherever they could. Like the man who can't afford to buy a new pair of shoes, he manages to make the old pair do the work. If the old pair happens to be pretty thin in the soles, and the winter proves to be very cold, he suffers in consequence.

THE 16-HOUR LAW.

The second and very obvious cause of the trouble has been restrictive laws to which railways have been forced to accede. These are: First, the so-called "16-hour law," under which no engine or trainmen can be kept in service longer than sixteen hours, without rest. Granting, at least for the sake of argument, that the 16-hour law was desirable or even necessary, the effect of it is as follows: The railway divisions usually are adjusted for runs of 125 to 175 miles, the average being not far from 150 miles. Coarse and heavy—that is to say, *drag* freight trains (in contradistinction to merchandise and perishable trains) make runs of this length over single-track roads, allowing for delays in passing tracks, at a speed of from 10 to 12 miles per hour, including detentions. It will thus be seen that under normal conditions the division will be covered in from 15 to 16 hours; but longer than this when the conditions are abnormal or congested.

Without question, this was a long day's work; but under normal conditions, the men who made the run had a long rest at the end of it. When the 16-hour law came into effect the railways were forced to one of two alternatives: Either to change the length of their engine runs, which involved a very large expense, or to run the trains lighter (that is to say, with less tonnage) so that they would make higher speed between division points; and, in a few cases, to cut the divisions in two—a very expensive expedient on account of the rule imposed by engine and trainmen upon the roads that a minimum pay of 100 miles a day shall be paid, even if less than 100 miles *is* made; in other words, the so-called "bonus mileage" rule.

In a severe winter, such as we have gone through, the experience of every railway has been that all expedients have broken down. Engineers and conductors, firemen and brakemen, have, on reaching a side-track or passing track at the end of 16 hours, notified the despatcher—as the law permits them to do—that their 16 hours were up and have deliberately abandoned their trains. I suppose it is safe to say that there isn't a road north of the Ohio river that hasn't had many of its trains thus abandoned and the engines frozen up. The splendid *esprit de corps* which used to exist, where the engine and train crew would keep going, and, like the captain on the bridge of the ocean steamer, bring the train into her "port," is a myth of the past; and, worse than this,

*Address before the Convention of Commercial Associations of the State of Michigan, at Detroit, on April 17.

one of the effects of trades unionism and meddling legislation between the employer and the employee has been that in such severe weather as we have recently had the old and well-tried men have laid off; that is, demanded furloughs, and the railway has had to call on its younger and less experienced men to man its trains. Small wonder that it cost a number of well-conditioned trunk lines in January last more to operate than they received in gross earnings.

THE BOILER INSPECTION LAW.

Another law which was urged by the trades union element in Congress, and which—while undoubtedly well meant by many of the men who voted for it—has had a very disastrous effect, is the so-called "boiler inspection law." Under the terms of this law, the chief inspector at Washington employs an army of inspectors who go over the country and without hesitation condemn locomotives, which, while not in first-class condition, are unquestionably safe to run. As is well known, all boilers are built with a very large factor of safety, and perfection in a locomotive boiler is not to be expected. A modern locomotive boiler has from 1,200 to 1,500 staybolts, between 4 and 5 in. apart, on all sides of the firebox. Under the law, five broken staybolts are sufficient to condemn an engine. This means that a locomotive boiler must be more than 99 per cent. perfect to meet approval; and yet it is safe to say that no high-pressure boiler can be cooled down and reheated again (as it must be for each washing out) without breaking at least this number of staybolts. In my early railway experience in locomotive shops, we used to consider that if there were not more than 5 staybolts in one cluster broken, the engine was safe; and I do not recall the bursting of a boiler due to broken staybolts in the side sheets of an engine. The worst effect of such broken staybolts would be the bulging of the sheet and consequent serious leakage of the engine.

The bursting of a fire tube or flue in an engine is a common thing, and in old days it used to be considered good practice to plug such a flue and to run the engine until the damage could be repaired. Under the rules today, no engine is permitted to run out of a terminal with a burst flue. Thus, without going into further details, it is safe to say that the present law in regard to boiler inspection will require the railways of the country to maintain from 15 to 25 per cent. more power to move the same volume of freight than was formerly necessary, and yet this law became effective at very short notice.

A number of other laws have added very much to the cost of railway operation and maintenance, such, for example, as the safety appliance act, in regard to freight cars, the mail compensation order, the automatic ash pan law, the steel mail car law, the third brakeman law in some states.

ECONOMIC CONDITIONS.

It is, perhaps, unnecessary to dwell on the fact that the cost of living has increased in the last five or ten years and that the railways have felt this very seriously. The principal "food" of the railway is coal, ties, lumber, steel rails, iron, etc. There has been a general advance in the price of practically all articles used by railways, from the low level of '93 to the present day, with the one exception of cement. The advance in the cost of coal and in the cost of ties has been very great in this period. The railways have had nothing to offset this advance in the cost of material and in the cost of doing business, except economy in railway service incident to the increased volume of business and increased efficiency of railway operation—handling of larger train units, etc. But, in spite of all efforts, it has been impossible in the last few years to stem the tide in many cases. Railway freight rates have been substantially stationary for a number of years. Up to 8 or 10 years ago, they moved progressively downward. Perhaps some rates are too high today, and railway men would be inclined to admit this in particular cases; but with the public attitude opposed to the advancing of any rate, no traffic manager or executive officer would dare to lower a rate, even if he thought it would encourage the volume of business and consequent earnings.

Passenger rates in all the states of the Middle West, and north of the Ohio river, have been reduced, generally to a level of 2 cents per mile; and yet the demand of communities for low rates for special occasions is just as great as ever it was. It is almost unnecessary to point out that in the days when 3 cents was the regular fare for ordinary travel, the railways were ready to give half rates, and even lower, for special occasions, to stimulate travel, etc.; but with the maximum fare reduced to 2 cents, it isn't possible to do this.

To add to our other difficulties, railway taxation has advanced steadily upward for a long period of time, and in this respect the state of Michigan has taken the lead and has well-nigh taxed the railways out of existence. It would be a bold man who would project the building of a steam railway in the state of Michigan today, in the light of your very drastic taxation methods. Undoubtedly, you can hold on to what you have got, because a railway isn't like a factory—it can't pull up stakes and go somewhere else. Even though it may be unfortunately located and prove to its owners a liability, rather than an asset, it must go on and on, assessing and reassessing its owners until enough money has been put in the foundation to make a superstructure which will sustain itself.

It is a favorite theme with a certain class of politicians to tell of the fabulous profits of railways. They do not tell of the fortunes that have been lost in railways—of the frequent reorganizations, nor of the wiping out of capital actually invested. Because we are a hopeful nation, and because there is always a fresh crop of investors coming along, there is always new money to be found to refinance an old property or to float a new one; but there has been a marked checking of the enthusiasm in this direction.

Few people, apart from those engaged in finance, comprehend the constant requirement of railways for cash for development work. The needs of this country in normal years are not far from five hundred millions per year. Now, this money must be drawn from the investor—the banker, the trustee, the insurance company and the savings bank—by the issuance of securities, backed by a valid promise of repayment of the principal and a fair rate of interest on the investment. The railway cannot sell securities—that is to say, *borrow money*—without credit, it has no credit unless its operations show a fair profit; it cannot show a fair profit if starved and strangulated by legislation; and who suffers most? The public, whose servants the legislatures and the commissions are. In this endless chain of circumstance, what is the answer?

CONCLUSIONS.

My conclusion is that the only remedy in the situation is cooperation. The railways do not complain of supervision so long as that supervision is intelligent and takes a fair share of the responsibility for its acts. When a man or a body of men negotiate for an interest which they represent, it is their duty to do the best they can for their client; but it is never advisable to press the bargain so far that the service demanded cannot be performed under the conditions of the bargain. There is such a thing as "killing the goose that lays the golden eggs." Railway men sometimes complain (and certainly with some show of justice) that the legislatures and commissions have only one interest, viz., to drive a sharp bargain for the benefit of the public, and thereby acquire merit in the public estimation; but, after all, if the legislatures or commissions take this view, it is a very short-sighted view, because obviously if railway business is unprofitable and continues in that condition for several years, the public interests of the country will suffer, just as the interests of you gentlemen have suffered this winter. You are calling a convention here to find out what the trouble is. You are calling on me for an expression of opinion, and, admittedly, my opinion is an *ex parte* statement of the case; but I have tried to be frank and straightforward with you.

But in the consideration of this question it would be well for the manufacturing and commercial interests to remember

that the idea of government regulation is spreading. No corporation can exist except by reason of charter rights from the government. There is scarcely a corporation but what sustains some public relation, and to which the broad and elastic phrase so often used by the courts, "affected with a public use," applies. From little beginnings we shall soon find a greater and greater disposition to extend the limits of corporate control and supervision. And, while I shudder to think of the multiplication of government bureaus, I think it is the duty of business men to study the problem in its broadest sense and try to work out some method of partnership between public interests and private control, which shall produce the best results for all. In the case of the railways, I think it would be well for the public to see that it is essential that the capital invested in railways should yield a fair return and that unless this condition exists, railways will be starved to death and service will become poorer, instead of better.

Perhaps we shall never instill into the mind of the public this idea of the absolute need of co-operation, unless there is an actual sharing of the profits. If, in lieu of taxation, the public could have a share in the net profits (as is done in Chicago in the case of the street railways), we would come nearer to fair conditions for all and the public would appreciate that they were not only indirectly, but also directly interested in prosperous conditions for the railways. In this way, and perhaps in no other way, will this hostile legislation against railways cease—legislation which with each succeeding year puts upon them new burdens and exactions, yet affords no means to the railway manager for increasing earnings or diminishing expenses.

THE BLOCK SIGNAL BOARD'S INSPECTION REPORTS.*

Appendix "C" to the fourth annual report of the Block Signal and Train Control Board contains what are stated to be "the results of inspections of signal appliances, systems, and methods" conducted by the board during 1911. This appendix is far from a creditable piece of work. It does not deserve to be included with the other work of the board.

From the title it would seem that the inspections were intended to discover what kind of signal appliances, systems, and methods are in use on the railways of the United States, and what effect these have upon operation—as to whether they are safe or unsafe. There is no doubt that inspections of the proper kind would reveal many conditions that could be improved, for there is probably not a road in the United States which is not somewhat lax in discipline or somewhat careless in the conduct of its physical properties. Such inspections should be carefully and comprehensively made by men who are fitted by education, training and experience for the purpose; and they should take into account not only the actual visible conditions, but also what defenses of these conditions can be offered. "The test of the pudding is in the eating," and a good many conditions which, viewed superficially, may appear dangerous are really not so when the special requirements which led to their use are understood. Proper allowances should be made also for special requirements imposed by local conditions. The results obtained ought then to be presented in such form that they would be useful. In reports of inspections which are properly conducted and which have in view the discovering and remedying of the wrong conditions, very little space would require to be given to accepted practices.

But the reports of the board's inspectors are by no means of this kind. For the most part they do not deal with signal appliances, systems, and methods, as the title would imply; and there has been little or no attempt to put them in shape so that such criticisms as they contain will be useful. Even a casual reading will show that the inspections were most superficial, and that the inspectors, instead of getting at the big things which are thought to be wrong in operating practice, devoted most of their time to enlarging upon isolated and non-representative cases.

The inspectors visited parts of 38 roads, of which the names are given. A considerable portion of their report is devoted to explanations of principles which have been so long accepted as standard, and are in such common use, especially on the larger roads to which the inspection appears to have been confined, that there would seem to be no good reason for devoting so much, or even any, space to them. The fact that they have received such an amount of attention might appear to indicate that, old as they are, they are still somewhat new to the inspectors of the board, which reflects no credit on the competency of the inspectors. For example, six lines are used to describe a time release arrangement whereby a leverman is prevented from accidentally taking away a clear signal from a train. Time locks similar to this for holding signals and routes have been installed on most of the interlocking plants built within the last 10 years, and have long since ceased to be novel except in the manner of their design, which, of course, has nothing to do with their application, inasmuch as they all effect the same result.

Wholesale condemnation of roads is rather frequent throughout the entire report. The condemnation is expressed in terms which the officers of the roads in question will have no difficulty in proving do not represent the conditions correctly. The inspections could not have been thorough, or the fact that there are perfectly good reasons for some of the practices which are mentioned would have become evident. For example, it is said that on the Chicago, Burlington & Quincy, "At crossovers trains stop before making the crossover movement regardless of the position of the signal." This road has very little automatic signal mileage, and it has been standard practice for many years in non-automatic territory to use normally clear station protection signals at station crossovers and passing tracks. Before the trains leave the main track at one of these points the station protection signals are pulled to the stop position by the trainmen, and are left in that position for rear end protection until after the main line has been cleared. Otherwise the operation at crossovers, so far as stopping is concerned, is similar to that on all other roads in the country, and is the same as it has been for many years. If this statement was intended to be a criticism it was obviously made in ignorance of the facts. If it was intended to commend the road's practice the effort might well have been directed along more profitable lines. If it was included merely to show that the inspectors were "on the job" and had the C. B. & Q. under surveillance, the energy was wasted.

In one instance 700 miles of road are condemned in two lines, and in another nearly 10,000 miles of track in 15 words. In several other places there is a marked tendency to apply the same terms that are used to describe a single special case to conditions on a whole system—in other words, to generalize from a single incident.

The Chicago & North Western comes in for some scoring of this kind. The report says with reference to this road: "One important interlocking plant was inspected. It was very poorly maintained. The inspector reports that it was in the worst condition of all the plants in large terminals that he had ever seen. As a rule the signalmen and repairmen were of a poor class." No one who has visited the new North Western terminal needs to be told that this could not possibly be any of the plants connected with it. The plant which was so poorly maintained might have been—in fact, it undoubtedly was—the old plant at the Wells street station, Chicago, which was abandoned when the new terminal was put in service, and on which for some time previous to abandonment, there naturally was not spent any more money than was absolutely necessary to keep it working. The statement that the signalmen and repairmen were of a poor class, following as it does the comment upon the badly maintained interlocking plant, would seem to have been an inference made by the inspector from the condition of the plant. In this case the report appears to indicate lack of discrimination on the

*Editorial in *The Signal Engineer* for April.

part of the inspectors as to what is representative of conditions on railways, and to show also very little idea on their part, of constructive criticism. At least the fact that the old plant which was in such bad condition was going to be taken out of service in the near future should have been mentioned.

In view of the nature of the wholesale condemnation the commendation which is given certain roads does not amount to much. The terms used are so general and so ambiguous, and the information on which the reports are based is so palpably incomplete, that there is probably very little satisfaction in getting a clean bill of health from inspectors of such demonstrated ignorance and incompetency.

They say of the Baltimore & Ohio: "Electro-gas automatic signals are in use on this road. They are maintained in excellent condition, and the track work was well constructed and well maintained." As a matter of fact there are a great many more electric automatic signals on the B. & O. than electro-gas, yet a reading of the report would not lead to such a conclusion.

There is a similar ambiguity in the description of the signals on the Maine Central. The Northern Pacific gets an O. K. in seven lines. Two interlocking plants were looked over, and the rest of the road was evidently inspected from the rear end of a train. The signaling on the Pittsburgh & Lake Erie was thoroughly approved in seven lines, but the statements are so general, so lacking in detail and judgment, that this approval will hardly be satisfactory even to the officers of the road.

Much of the effort of the inspectors seems to have been wasted either upon trivialities which mean nothing one way or the other to persons familiar with signaling, or upon practice which is already standard. For instance, in three cases, it is said in effect that signal blades were so dirty that it was impossible to tell the color of the blade a short distance away. This expresses a very common condition in and about yards—a condition which it is almost impossible to prevent, but which it is not worth while to prevent, simply because enginemen do not run according to the colors of signal blades, but according to their positions!

In dealing with things which are already accepted as standard practice and used wherever there are signals, the inspectors have, perhaps, unwittingly, expressed themselves in language as subtle in its innuendo as that of the sailor who, after he had been chided by his Puritanical captain for being drunk, wrote in the ship's log, "The captain was sober today." A case in point is the statement that, "On the Lehigh Valley switch boxes are installed on all switches in main tracks and switch indicators are used." In reference to the New York Central the report reads, "Switch boxes are applied to all main track switches and switch indicators are used," and on the Maine Central, "proper fouling and switch box protection is furnished for all switches and sidings leading to the main track." Fortunately the innuendo is harmless. It is true there is no better way to find out whether a road uses switch boxes than to look for them, but to conduct inspections on the supposition that they do not use them in automatic territory would seem, to railway men at least, to be about as useless an expenditure of effort as to inspect passenger cars to see if they are equipped with couplers.

Some parts of the report are so lacking in detail and so unintelligible that they are likely to be of little use to any body. For example, an interlocking plant is described as follows: "Track circuits are used only on the tracks of the Pennsylvania and extend only to the heel of the crossing frog. With this arrangement clear signals may be given on the Pennsylvania when the crossing is occupied by a train on the Lake Erie, Alliance & Wheeling." This seems to refer to a mechanical plant. If the description means that clear signals may be given on the Pennsylvania when a route is set up for a train on the other road the inference would be that there is no mechanical locking in the machine—such an unusual condition that if it were actually found it should have been exactly described. If, however, the statement is intended to mean that a train might be standing between the derails on the L. E. A. & W. while blocking the crossing for Pennsylvania trains, so that clear signals could be given on the tracks of the latter, the words merely express a condition which, until the comparatively recent adoption on a large scale of route locking, was the most satisfactory one that had been devised, and one which, on account of the unusual combination of circumstances which would be necessary to bring about a collision, was not considered dangerous. If the inspectors intended to criticize the roads interested for the lack of route locking, why wasn't the criticism made in specific terms?

Other portions of the report indicate a similar lack of acquaintance on the part of the inspectors with railway operating practice. In two places it is noted that some of the switches within the limits of the interlocking plant were not interlocked. This in itself means nothing, as there are many plants in the country where switches within the interlocking limits are purposely left out for convenience in operating, especially in connection with switching movements, and the leaving out of which does not increase the liability to accident. In fact, it is believed by some signal engineers that the tendency to interlock everything within a certain distance of an interlocking tower has led to a large unnecessary expenditure in a good many installations.

It is apparent from a careful reading of the entire report that a large number of the inspections were conducted from the back ends of trains. Considerable information also seems to have been gathered from talks with individual signalmen. The practice as to flagging on several roads is set forth in general terms, whereas the terms used should have been restricted to the single isolated cases from which the inspectors were led to draw their general conclusions.

The foregoing are sufficient to show the inadequacy and incompetency of the report, either as such an authoritative commendation of operating methods as should emanate from so high an authority as the Block Signal Board, or as such a criticism as will lead to any greater safety on the railways of the country. It is to be feared that the report will be considered by many railway men as an excellent example of the animus of the inspector who is hired to inspect, and who would not be thought to be doing his work properly unless he criticized without caring much about the intrinsic value of his criticism.

Even the reader who knows nothing of railway work will readily discern that the inspections which are reported are superficial and do not represent the conditions they are intended to cover. And perhaps he will wonder, since the reports are not creditable to the board, why such inspections are made at all. The natural supposition would be that if the board is to conduct inspections they should be conducted in such a way as will do the most good—or, at least, some good. If, for instance, the inspectors had reported a year ago that certain roads on which traffic was so intensive that it ought to have been handled by automatic block signaling, were still using the time interval principle of operation on their main lines, some of the recent awful accidents might have been prevented. Appendix "C" ought to be recalled. It ought not to be permitted to remain among the reports of a body whose work has been of so much value and of such a uniformly high quality heretofore that the contrast with Appendix "C" only serves to bring out more strongly the incompetency, and even imbecility, of the latter.

TRAFFIC STATISTICS IN 1910.

The accompanying table is an abstract from a compilation of figures made by the Bureau of Railway Economics from reports of railways to the Interstate Commerce Commission. The Bureau of Railway Economics' compilation gives figures for the years 1900 to 1910, inclusive. Our abstract gives the figures for 1910 only and, as will be noted, our abstract gives round numbers only. The figures in general are self explanatory. The per cent. which each group bears to the total United States is shown where possible. By "Miles of line" is meant road mileage, and by "Mileage operated, main tracks" is meant track miles, including first, second, third, etc., tracks and branch line track mileage, but excluding miles of yard tracks and sidings.

TRAFFIC STATISTICS.

Index.	United States.	Group I.	Per cent.	Group II.	Per cent.	Group III.	Per cent.	Group IV.	Per cent.	Group V.	Per cent.	Group VI.	Per cent.	Group VII.	Per cent.	Group VIII.	Per cent.	Group IX.	Per cent.	Group X.	Per cent.
1. Miles of line operated—single track	† 241	8	3	24	10	26	11	14	6	28	12	52	22	14	6	34	14	18	8	23	9
2. Mileage operated—main track	† 266	10	4	34	13	31	12	15	6	29	11	57	21	15	6	35	13	18	7	23	9
3. Mileage operated—yard track and sidings	† 86	4	5	16	19	14	16	4	5	8	9	17	20	4	4	9	10	4	5	6	7
4. Mileage operated—all tracks	† 352	14	4	50	14	45	13	19	5	36	10	74	21	18	5	43	12	23	6	29	8
5. Population	** 92	7	7	20	22	11	12	7	7	12	13	15	16	2	2	7	8	5	6	5	6
6. Area	† 2,970	62	2	108	4	125	4	140	5	299	10	372	13	412	14	367	12	325	11	759	26
7. Density of population	31	106	..	185	..	92	..	48	..	41	..	41	..	5	..	20	..	16	..	7	..
8. Population per mile of line	382	807	..	840	..	438	..	477	..	435	..	291	..	148	..	219	..	284	..	235	..
9. Population per mile of main track	346	647	..	594	..	366	..	444	..	424	..	266	..	142	..	215	..	282	..	231	..
10. Square miles of area per mile of line	12	8	..	5	..	5	..	10	..	11	..	7	..	30	..	11	..	18	..	34	..
11. Number of locomotives	* 58,9	3,3	..	13,6	..	8,10	..	3,1	..	4,7	..	10,7	..	2,5	..	5,10	..	2,4	..	3,7	..
12. Locomotives per 1,000 miles of line	245	406	..	571	..	344	..	222	..	168	..	207	..	178	..	176	..	132	..	161	..
13. Number of freight cars	2,135	83	..	516	..	403	..	124	..	171	..	428	..	74	..	189	..	60	..	87	..
14. Freight cars per 1,000 miles of line	† 8,9	10,2	..	21,7	..	15,4	..	8,9	..	6,1	..	8,3	..	5,3	..	5,6	..	3,3	..	3,8	..
15. Number of passenger cars	* 47,1	5,4	..	12,3	..	5,6	..	2,1	..	3,4	..	7,6	..	1,7	..	3,9	..	1,5	..	3,7	..
16. Passenger cars per 1,000 miles of line	195	660	..	516	..	214	..	150	..	122	..	147	..	121	..	114	..	82	..	163	..
17. Total number of cars	2,290	93	..	547	..	423	..	131	..	183	..	455	..	83	..	207	..	66	..	102	..
18. Total cars per 1,000 miles of line	* ...	...	..	...	..	...	..	...	..	...	..	...	..	...	..	...	..	...	..	...	..
19. Tractive power of locomotives (lbs.)	Total, U. S., 1,588,894,480. Ave. per loco., U. S., 27,282.																				
20. Capacity of freight cars (tons)	Total, U. S., 76,578,735. Ave. per car, U. S., 36.																				
21. Freight train mileage—revenue service	** 635	25	4	128	20	112	18	32	5	65	10	122	19	27	4	66	10	29	5	31	5
22. Mixed train mileage—revenue service	¶ 35,8	1,2	..	3,1	..	2,3	..	2,7	..	5,3	..	7,8	..	1,5	..	5,2	..	2,9	..	3,8	..
23. Tons of revenue freight carried	** 1,026–(b)	...	..	...	..	...	..	...	..	...	..	...	..	...	..	...	..	...	..	...	..
24. Tons per inhabitant	11.16–(b)	...	..	...	..	...	..	...	..	...	..	...	..	...	..	...	..	...	..	...	..
25. Tons carried one mile	¶¶ 255	7	3	66	26	52	20	14	6	19	8	47	18	11	4	19	7	8	3	13	5
24. Freight train density	2,669	3,148	..	5,376	..	4,277	..	2,288	..	2,330	..	2,354	..	2,030	..	1,955	..	1,587	..	1,411	..
27. Freight density	† 1,071	874	..	2,797	..	2,021	..	1,098	..	716	..	907	..	781	..	566	..	421	..	586	..
28. Ton miles per inhabitant	2,773	1,068	..	3,295	..	4,544	..	2,175	..	1,592	..	3,081	..	5,156	..	2,508	..	1,451	..	2,402	..
29. Freight revenue	** $1,927	$78	4	$423	22	$307	16	$96	5	$157	8	$350	18	$100	5	$182	9	$80	4	$155	8
30. Freight revenue per mile of main track	$7,239	$7,706	..	$12,564	..	$9,778	..	$6,389	..	$5,455	..	$6,175	..	$6,909	..	$5,260	..	$4,330	..	$6,705	..
31. Freight revenue per train mile	2.862	$2.937	..	$3.216	..	$2.686	..	$2.761	..	$2.227	..	$2.697	..	$3.549	..	$2.554	..	$2.524	..	$4.416	..
32. Freight revenue per ton mile	$.753	$1.115	..	$.641	..	$.588	..	$.655	..	$.802	..	$.751	..	$.945	..	$.971	..	$1.056	..	$1.196	..
33. Freight train miles per freight locomotive	* 18,2	18,3	..	15,7	..	20,6	..	17,0	..	24,10	..	18,5	..	17,3	..	17,9	..	18,1	..	14,3	..
34. Ton miles per train mile (tons per train)	380	264	..	502	..	457	..	424	..	278	..	359	..	376	..	263	..	240	..	369	..
35. Average haul per ton (miles)	(a) 250	94	..	128	..	117	..	193	..	150	..	141	..	271	..	183	..	132	..	175	..
36. Ton miles per freight locomotive	7,304	4,798	..	8,071	..	9,616	..	7,872	..	7,588	..	7,077	..	6,862	..	5,103	..	4,781	..	5,972	..
37. Ton miles per freight car mile (tons per car)	† 13.4	10.5	..	15.2	..	14.9	..	14.6	..	12.2	..	12.9	..	12.2	..	11.0	..	10.5	..	12.9	..
38. Passenger train mileage (revenue service)	549	38	7	115	21	78	14	23	4	48	9	103	19	24	5	54	10	23	4	43	8
39. Number of revenue passengers carried	** 972	153	16	332	34	101	10	30	3	53	6	144	15	17	2	54	6	23	2	65	7
40. Average number of trips per inhabitant	10.56	23.30	..	16.60	..	8.79	..	4.49	..	4.40	..	9.57	..	8.01	..	7.26	..	4.46	..	12.11	..
41. Passengers carried one mile	§ 32.3	2,10	9	7,4	23	4,0	13	1,1	3	2,1	7	5,9	18	1,6	5	2,9	9	1,2	4	3,1	10
42. Passenger train density	2,306	4,734	..	4,814	..	2,976	..	1,692	..	1,713	..	1,986	..	1,856	..	1,619	..	1,271	..	1,952	..
43. Passenger density	† 138	375	..	314	..	158	..	82	..	79	..	115	..	115	..	90	..	70	..	143	..
44. Average number of miles traveled per inhabitant	352	457	..	368	..	352	..	163	..	176	..	390	..	756	..	393	..	237	..	584	..
45. Passenger revenue	** $629	$51	8	$126	20	$75	12	$24	4	$49	8	$111	18	$32	5	$61	10	$29	5	$72	12
46. Passenger service train revenue	** $765	$60	8	$153	20	$96	13	$29	4	$60	8	$137	18	$39	5	$75	10	$34	4	$82	11
47. Passenger revenue per mile of main track	$2,365	$5,083	..	$3,733	..	$2,386	..	$1,588	..	$1,695	..	$1,959	..	$2,224	..	$1,763	..	$1,549	..	$3,125	..
48. Passenger revenue per train mile	$1,147	$1.349	..	$1.094	..	$.963	..	$1.015	..	$1.023	..	$1.082	..	$1.321	..	$1.119	..	$1.247	..	$1.687	..
49. Passenger revenue per passenger mile (cents)	1.938	1.718	..	1.695	..	1.846	..	2.176	..	2.256	..	1.887	..	2.073	..	2.079	..	2.321	..	2.292	..
50. Passenger service train revenue per mile of main track	$2,873	$5,911	..	$4,556	..	$3,054	..	$1,959	..	$2,059	..	$2,413	..	$2,712	..	$2,177	..	$1,816	..	$3,567	..
51. Passenger service train revenue per train mile	$1,304	$1.522	..	$1.298	..	$1.193	..	$1.115	..	$1.113	..	$1.237	..	$1.517	..	$1.259	..	$1.300	..	$1.747	..
52. Passenger train miles per passenger locomotive	* 40,2	29,7	..	35,5	..	42,5	..	43,5	..	49,0	..	44,8	..	43,5	..	37,1	..	45,2	..	44,1	..
53. Passenger miles per train mile (passengers per train)	56	76	..	63	..	51	..	42	..	41	..	53	..	60	..	49	..	48	..	67	..
54. Average journey per passenger (miles)	34	20	..	23	..	41	..	36	..	40	..	41	..	94	..	54	..	53	..	48	..
55. Passenger miles per passenger locomotive	‡ 2,35	2,30	..	2,28	..	2,21	..	1,95	..	2,18	..	2,57	..	2,77	..	2,01	..	2,44	..	3,08	..
56. Passenger miles per passenger car mile (passengers per car)	15.8	22.2	..	16.9	..	14.8	..	12.7	..	12.7	..	15.6	..	15.7	..	14.3	..	13.9	..	17.1	..

* Two zeros omitted. † Three zeros omitted. ‡ Four zeros omitted. ¶ Five zeros omitted. ** Six zeros omitted. § Eight zeros omitted. ¶¶ Nine zeros omitted.

(a) Average haul per ton over all roads of the United States and other groups regarded as one railway system.

(b) Covers only freight reported by railways as originating on their own line and not freight delivered to them by connecting carriers.

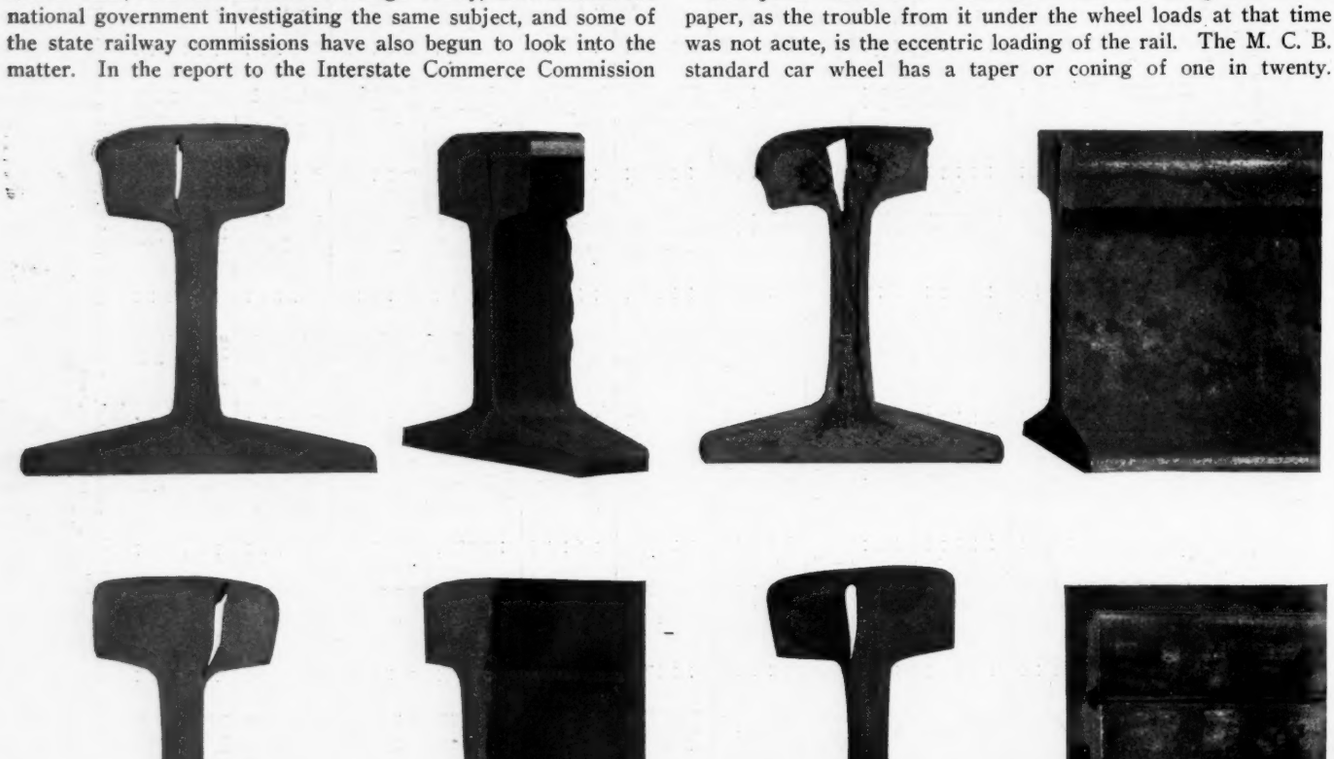
RAIL FAILURES DUE TO ECCENTRIC LOADING.

Stresses Resulting from the Use of the Present Sections Under Coned Wheels Exceed the Elastic Limit of the Metal.

BY C. A. MORSE,

Chief Engineer, Atchison, Topeka & Santa Fe System.

The question of rail failures is a very live one at the present time, and is naturally the subject of investigation by every railway and by all railway associations interested in maintenance. It has perhaps been natural for railway companies to feel that the quality of rail furnished in the larger sections was not equal to what had formerly been furnished in the smaller sections. This has caused the manufacturers to investigate the quality of steel rails being made at the present time. Accidents due to broken rails, such as that on the Lehigh Valley, have started the national government investigating the same subject, and some of the state railway commissions have also begun to look into the matter. In the report to the Interstate Commerce Commission on the Lehigh Valley accident, James E. Howard, of the United States Bureau of Standards, intimates that the limit of wheel loads for steel rail has been reached. Apparently, however, the investigations and inquiries are all pointed solely to the chemical composition of the steel in the rail and to the process of manufacture. Little, if anything, has been said, or apparently done within the last decade looking to improved design of rails and wheels, except the adoption of the American Railway Association rail sections and a little change in the radius of the fillets for car wheel flanges.



Sections of 85-Lb. Rails, Showing Failures from Split Heads.

In the transactions of the American Society of Civil Engineers for September, 1889, D. J. Whittemore, past president of that society, and the then chief engineer of the Chicago, Milwaukee & St. Paul, wrote an exhaustive article on the subject of "Cylindrical Wheels and Flat Top Rails for Railways." At the time this paper was written, axle loads were only about half what they are now and rails were very much lighter, but Mr. Whittemore called attention in this paper to the fact that even under the wheel loads of that period, owing to the small area of contact between the wheel and the rail, the elastic limit of the metal in the rail was exceeded. If that was true at that time what must be the condition at the present time with 20,000 lb. wheel loads on 34 in. wheels and 30,000 to 35,000 lb. wheel loads on 69 to 79 in. wheels.

One point which Mr. Whittemore did not bring out in his paper, as the trouble from it under the wheel loads at that time was not acute, is the eccentric loading of the rail. The M. C. B. standard car wheel has a taper or coning of one in twenty. This has existed for years, and is one of those things that have come down from early days and the necessity for which has apparently been taken for granted. The writer was taught in Henck's field book over thirty years ago that the wheel was coned for the purpose of tending to equalize the diameter of the wheel in passing around curves; that owing to the widening of gage on curves and the play in the boxes of the truck the larger diameter of the wheel was brought in play on the outside rail and the smaller diameter on the inside rail tending to prevent slippage and to overcome the difference in distance around the curve on the two rails, which was a very good theory, but under present conditions has no value. At the present time it is considered good practice not to widen the gage up to and including 8, or even 10, deg. curves. The wear on the tread of the wheels soon does away with the coning, with the result that there is practically no difference in the diameter

of the wheel in the width that the play in the boxes of the truck permits.

In the case of a new wheel and a new rail the coning of the wheel causes the line of pressure in the case of an M. C. B. wheel and a 90 lb. A. R. A. rail to be located 0.7 in. away from the center of the rail toward the inner edge of the head, thus loading the rail eccentrically and tending to split the head, to split the web of the rail longitudinally, and, owing to the area of contact being only from one-third to one-half a square inch, exceeding the elastic limit of the metal, causing a flow, this flow naturally being toward the inside edge of the rail. In the design of structures, eccentric loading is studiously avoided, but in the case of a steel rail, subject, as it is, to continuously repeated application of loads, this matter seems to have been ignored completely. Broken tires are increasing practically as fast as broken rails. They have not attracted the attention of the public, but they are worrying mechanical officers nearly as much as broken rails are worrying maintenance officers.

The strains in the head of a rail due to wheel loads are so numerous that the combined effect of a number of them is very hard on the rail. Referring to Fig. 1, they can be enumerated as follows:

First. Direct crushing stress due to the wheel load at the point A.

Second. Vertical shearing stress along the line BD owing to the wheel load at A.

Third. Longitudinal shearing stress along the line BD owing to tractive force applied at A.

Fourth. Bending stress at B due to the vertical wheel load at A.

Fifth. Horizontal side pull at B due to sidewise slipping of the wheel.

Sixth. Longitudinal stress in the rail head lying to the right of the line BD due to tractive force applied at A.

Seventh. Stress due to load at A; rail considered as a simple girder.

Owing to the conditions of surface, grade and speed, these different strains can be combined in a variety of ways, each combination tending, however, to disrupt the head of the rail, split the web or cause the metal to flow over the edge, and when these combinations of strains are repeated thousands of times, it is not strange that the material is ruptured. The use of a heavy steel tie plate from 3/8 to 5/8 in. thick makes the effect of the continuous pounding on the rail much more destructive than it was when the rail rested directly on a wooden tie, which served to cushion the blow to some extent.

The rail failures due to head troubles have become so numerous during the past few years as to attract special attention. For instance, on one road during 1910 there were 1,146 breakages of 85 and 95 lb. rails, of which those due to a head and web troubles were as follows:

	On tangent.	On curve.	Total.
Crushed head	134	87	221
Split head	181	93	274
Flow of metal	10	5	15
Split web	47	21	68
	372	206	578

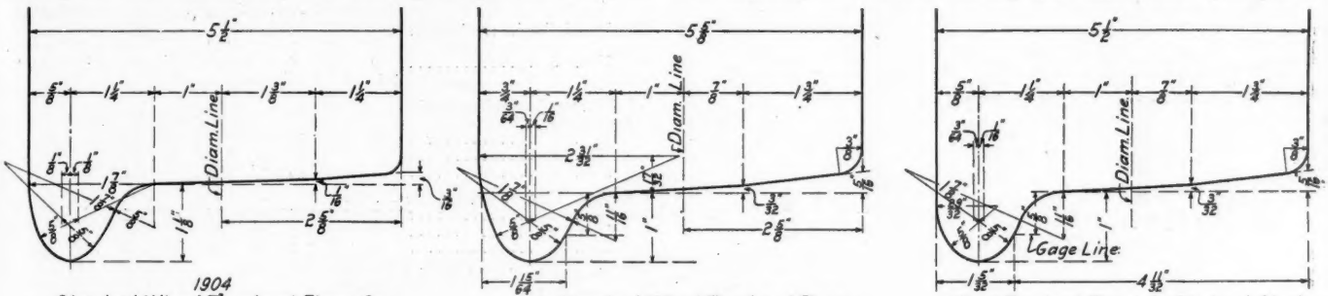
In 1911 out of 1,350 breakages in 85 and 90 lb. rails there were:

	On tangent.	On curve.	Total.
Crushed head	184	65	249
Split head	313	107	420
Flow of metal	11	5	16
Split web	110	43	153
	618	220	838

Fifty per cent. of the total breakages in 1910 and 62 per cent. in 1911 were in the head and web.

By doing away with the coning of wheels and having a cylindrical wheel the bearing of the load would be in the center of the head directly over the web, doing away with the eccentric loading which tends to split the head and split the web. With the point of contact in the center of the head of the rail any wear or flow of metal would immediately tend to increase the area of contact and decrease the pressure per square inch, thus reducing the tendency to crush the rail, split the head or cause the metal to flow. Our present A. R. A. section has a radius for the top of the head of 14 in. By increasing this radius to 20 in. the area of contact would be greatly increased between a new rail and a new wheel, and thus the tendency to wear and flow would be materially reduced.

The argument is made that the rail and the tire become worn shortly so as to give a larger area of contact and that, therefore, they give this larger area under the present section of rail and tire. This is true to a certain extent, but on lines running heavy power they are constantly laying new rail, receiving new

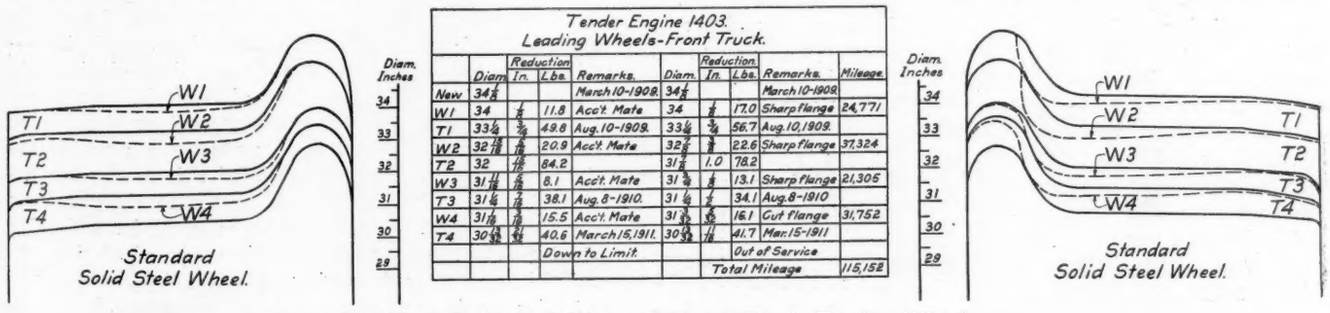


1904 Standard Wheel Tread and Flange for Road Eng. Driving Wheels, Eng. Truck Wheels, Trailers and Tender Truck Wheels.

Standard Wheel Tread and Flange. M. C. B. Standard of 1909, Cast iron Wheels.

Wheel Tread and Flange for Steel and Steel tired wheels. Taken from the proceedings M. C. B. Vol. 44-1910.

Development of Standard Wheels.



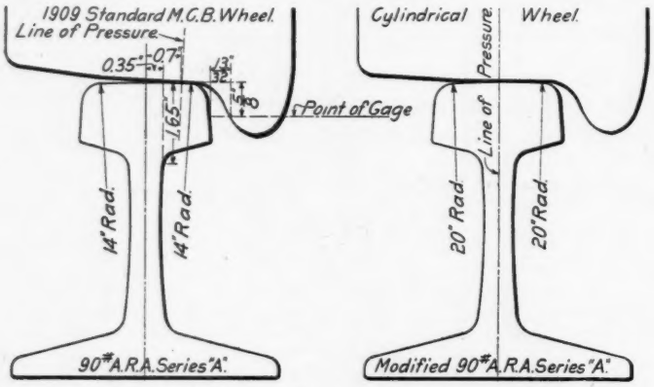
Tender Engine 1403. Leading Wheels-Front Truck.

	Diam.	Reduction In.	Reduction Lbs.	Remarks.	Diam.	Reduction In.	Reduction Lbs.	Remarks.	Mileage.
New.	34 1/2			March 10-1909.	34 1/2			March 10-1909.	
W1	34	1/16	11.8	Acc't. Mate	34	1/16	17.0	Sharp flange	24,771
T1	33 1/2	3/16	49.8	Aug. 10-1909.	33 1/16	3/16	56.7	Aug. 10, 1909.	
W2	32 15/16	1/16	20.9	Acc't. Mate	32 5/16	1/16	22.6	Sharp flange	37,324
T2	32	1/16	84.2		31 5/16	1.0	78.2		
W3	31 11/16	1/16	8.1	Acc't. Mate	31 3/16	1/16	13.1	Sharp flange	21,305
T3	31 1/16	1/16	38.1	Aug. 8-1910.	31 1/16	1/16	34.1	Aug. 8-1910	
W4	31 1/16	1/16	15.5	Acc't. Mate	31 1/32	5/32	16.1	Cut flange	31,752
T4	30 13/32	2/32	40.6	March 15, 1911.	30 1/32	1/16	41.7	Mar. 15-1911	
				Down to Limit.				Out of Service	
								Total Mileage	115,152

Graphical Record of Wear of Front Truck Tender Wheels.

cars and equipping old cars with new wheels, and our locomotive wheel tires are turned down often enough to give the effect of a new wheel.

Some railways and locomotive works have adopted the practice of reducing the coning or taper on locomotive tires to one in 38 instead of one in 20. This is a step in the right direction,



Present and Suggested Sections of Wheels and 90-Lb. Rails, Showing Point of Application of Load.

but why one in 38? Why not level? It would seem that the most direct way to get relief would be for the committees of the Master Mechanics, Master Car Builders and American Railway Engineering Associations to take this question up together, with the idea of re-designing the rail and tire sections, as the tire wear can be reduced and number of broken tires lessened by the same remedy that helps the rail.

MANUAL BLOCK SYSTEM ON SINGLE TRACK.*

In the last annual report reference was made to the introduction of the block system on the Baltimore & Ohio Southwestern (now operated directly as a part of the Baltimore & Ohio). On 180 miles of this company's line, nearly all single track, the necessary apparatus for the operation of the manual block system was installed in less than one week, 62 offices being equipped with telegraph instruments and batteries and a new telegraph wire being put up throughout the length of the line (the poles being already in place).

Including other sections on which the block system was introduced about the same time, the length of road now operated is 254 miles, and the number of regular passenger trains each way daily is from 9 to 13 (on different parts of the road). The number of station operators now in service is 110, the pay rolls amounting to $6,262 a month. The number of telegraphers in service before the adoption of the block system was 64 and the total increase in operating expense made necessary by the change was $2,459 a month. The outdoor signals used are those formerly used to stop trains for despatchers' orders.

On the question of the number of permissive movements necessary, which is one of the primary questions in the introduction of the block system on lines over which the volume of traffic is moderate, the record of three days of average traffic in the month of November, 1911, shows that the freight trains received clear signals at nearly nine-tenths of the block-signal stations. The figures for the three days are given in the table below. On the section of line here referred to no permissive signaling is allowed for any train following a passenger train. For passenger trains following freight, permissive signals are allowed, and in the record here shown 86 such movements were made.

The headings of the columns are as follows: (1) Date; (2) number of passenger trains on train sheet; (3) number of freight trains on train sheet; (4) absolute clear signals given to freight trains; (5) permissive signals given to freight trains; (6) permissive signals given to passenger trains following freight trains.

*From the annual report of the Block Signal and Train Control Board of the Interstate Commission.

CLEAR AND PERMISSIVE BLOCK SIGNALS; BALTIMORE & OHIO SOUTHWESTERN.

1	2	3	4	5	6
Date.	Passenger trains.	Freight trains.	Clear freight.	Permissive freight.	Permissive passenger.
Cincinnati district eastbound:					
Nov. 2	9	9	134	9	6
Nov. 3	9	6	96	7	4
Nov. 4	11	9	124	9	5
Washington-Louisville district eastbound:					
Nov. 2	13	17	130	20	12
Nov. 3	13	14	122	14	10
Nov. 4	14	16	126	18	13
Cincinnati district westbound:					
Nov. 2	9	6	96	5	8
Nov. 3	9	6	90	10	8
Nov. 4	9	8	126	8	10
Washington-Louisville district westbound:					
Nov. 2	13	15	122	17	4
Nov. 3	13	15	116	29	3
Nov. 4	13	14	123	8	3
Total	135	135	1,405	154	86

The rules in force on this line contain the usual provisions for moving trains according to time-table rights and despatchers' orders whenever the block-signal wire fails. Meeting points are fixed by time-table and by despatchers' orders, as in the general American practice on single-track lines. In addition to the ordinary requirements, a rule on this division (Rule S. 6) provides that when a meeting order is sent to trains a copy of the order shall be sent to the signalman at the meeting point; and also that this requirement shall be carried out even when the meeting point is a non-telegraph station; this by sending a copy of the order to two telegraph offices—one on each side of the meeting point; the operator at each of these stations being required to give a card to the train which passes him.

This and other examples of practice are given for the purpose of illustrating the facility with which the block system can be and is used with only the minimum expenditures for signals, wires, apparatus and attendants. This memorandum is not to be taken as an expression concerning the correctness in detail of the practice referred to, nor as an approval either of permissive signaling in general or of its use in these particular instances; but the data given, while incomplete in some respects, show that on the lines cited nearly all passenger trains and a large part of the freight trains are constantly being run by the space-interval system, doing away with numerous, varied and troublesome risks of the time-interval system. This is a definite improvement accomplished. But, what is of equal and potentially greater significance, the facilities are always at hand for enforcing the absolute block system at any time for *all trains*. In case of snowstorms or dense fogs, making it difficult or impossible for enginemen to see ahead, or when from any cause special caution becomes necessary, a word from the despatcher puts into effect at once the rule forbidding all permissive blocking. Where it is necessary to provide against dangers from sudden local fogs, station telegraphers can be authorized to adopt this rule on their own motion without waiting for special authority.

The bills which have been presented in Congress by Hon. John J. Esch, of Wisconsin, as well as the recommendations which have been put forth by the Interstate Commerce Commission and by the Block Signal and Train Control Board, have all been drawn in conformity to the condition which is here illustrated and which, indeed, prevails to a greater or less extent on nearly all railways which use the manual block system. That is to say, the primary idea is the establishment and maintenance of the facilities for enforcing the space interval between trains. The extent to which exceptions or suspensions may be allowed, while not unimportant, is, from a governmental standpoint, a secondary question.

THE "TITANIC" DISASTER.

The sinking of the new steamship Titanic of the White Star Line by an iceberg in the Atlantic ocean, 1,150 miles east of New York, on the morning of April 15, about two o'clock, appears to have resulted in the loss of over 1,300 lives, the number saved out of the 2,200 total of passengers and crew being given at 868. Two prominent railway men were aboard, Charles M. Hays, of Montreal, president of the Grand Trunk, and John B. Thayer, of Philadelphia,, second vice-president of the Pennsylvania. Other prominent persons on the ship were John Jacob Astor, of New York, a director of the Illinois Central and the Delaware & Hudson; Isidor Straus, of New York, merchant and former congressman; Benjamin Guggenheim; J. Bruce Ismay, managing director of the White Star Line, and Col. Archibald Butt, military aide to President Taft. At this writing the reports indicate that Mr. Thayer and Mr. Ismay are the only ones of these who were saved. An account of Mr. Hays' career is given below.

The Titanic was the largest ship in the world, being a little larger than her sister ship, the Olympic, and was on her first voyage. She was 882 ft. long, or nearly 100 ft. longer than the Mauretania; 92 ft. wide and 94 ft. deep; tonnage, 46,000. She had 15 watertight compartments. She had accommodations for 3,500 passengers, and carried a crew of 860. She is said to have cost $10,000,000. The aggregate losses of ship and cargo (which included diamonds worth $5,000,000), added to the insurance on the lives of passengers are estimated at from 15 to 25 millions of dollars. The disaster occurred in west longitude 50.14, north latitude 41.46. All of the survivors are being brought to New York on the Cunard steamship Carpathia. The signals of distress given by the Titanic were first received on Sunday night at 10:25 [presumably Greenwich time] by the station at Cape Race, Newfoundland; and the first vessel to respond and start for the scene was the Virginian of the Allan Line. The Virginian, however, was 170 miles away and did not arrive soon enough to be of any assistance. The first ship actually to reach the survivors was the Carpathia. This was at daybreak, or some eight hours after the sinking of the Titanic. All of the survivors were in the boats, and all of the boats were accounted for.

Charles M. Hays.

Mr. Hays was one of the most widely known railway men in America; and Sir Wilfred Laurier at a dinner of the Canadian Club once said of him. "He is beyond question the greatest railway genius in Canada. As an executive genius he ranks second only to the late Edward H. Harriman."

Mr. Hays was born on May 16, 1856, at Rock Island, Ill., and began railway work in November, 1873, as a clerk in the passenger department of the Atlantic & Pacific at St. Louis, Mo., and was later clerk in the auditor's and the general superintendent's offices of the same road. In 1887 he was appointed secretary to the general manager of the Missouri Pacific, and from 1884 to 1886 he was secretary to the general manager of the Wabash, St. Louis & Pacific, and then for one year was assistant general manager of the same road. In 1887 he was appointed general manager of the Wabash Western, and later of the consolidated Wabash System, becoming vice-president and general manager of the Wabash in 1894, remaining in that position until December, 1895. During that period he was a director of the Chicago & Western Indiana, the Belt Railway of Chicago, the Detroit Union Railroad & Station Company, the Hannibal Union Station Company, the Keokuk Union Station Company, the Kansas City Union Station Company, and the Terminal Road Association of St. Louis, of which latter company he was also chairman of the executive committee. He represented the Wabash in the Western Traffic Association, in the Central Traffic Association, and in the Joint Traffic Association. He became general manager of the Grand Trunk on January 1, 1896, and left that company in January, 1901, to become president of the Southern Pacific Company. When this property changed hands he resigned and returned, in 1902, to the service of the Grand Trunk, as second vice-president and general manager. He was elected president of the Grand Trunk in October, 1909.

During the period of Mr. Hays' control the original Grand Trunk has not only been rebuilt, but its terminal facilities have been extended and improved, and its earning capacity increased by the reduction of grades, construction of second-track and heavy bridges and laying heavy rails throughout. In addition, increased mileage has been added by the control of the Central Vermont and the absorption of the Canada Atlantic, and by the joint control of the Detroit & Toledo Shore Line. The most important undertaking, outside of the direct operation of the Grand Trunk, has been the building, under Mr. Hays' direction, of the Grand Trunk Pacific, which is being built from Moncton, N. B., west to Prince Rupert, B. C., on the Pacific coast, and is to have 3,550 miles of main line.

Mr. Hays was very self-possessed, seldom showing irritation or anger, and his capacity for work seemed unlimited. He had an exceptionally strong physique, and took every opportunity to get hard outdoor exercise. If there were any reasonable chance of a man surviving the disaster to the Titanic except through the life boats, Mr. Hays would be that man; he never let go as long as there was anything to be gained by holding on.

Construction work on the San Bernardo to Volcan railway, Chile, is actively progressing, some variation having been made in the line at the point where it crosses the Yeso river. On the Rancagua to Donihue railway the rails have been laid for a distance of about 6 miles, and on the Alcones to Pichilemu railway the work of construction is slowly progressing, while the Curico to Hualane railway will be completed about May 1, 1912.

DEFECTIVE BOX CARS AND DAMAGED FREIGHT.

Second Article. Few Side Doors Are Cinder and Water Proof. How They Can Be Made So. A Good Grain Door.

The first article of a series on this subject appeared in the issue of April 12. The large amount of damage to freight due to defective equipment was considered at length, and the necessity for making box car doors burglar proof was strongly emphasized. This article, the second of the series, will consider the problem of making the doors cinder and water proof, and will also present methods of making the grain doors tight and of protecting flour against the entrance of cinders and water through the openings about the edges of the ordinary box car door, which is far from proof against these elements.

SIDE DOORS.

A satisfactory side door for box cars has four requirements. It must be rain proof, cinder proof, and burglar proof when first applied and should be so constructed as to remain in that condition indefinitely. One trip through a freight yard will demonstrate that very few of the doors on box cars meet all of these requirements, and yet each one of them is vitally important. A condition which is not at all unusual is shown in the photograph, Fig. 16. This view was taken inside of the car and while the door was locked and sealed; the crack at the rear is from 9/16 in. to 5/8 in. wide; and at the middle of the door at the bottom it is fully 1 in. wide. This door is not on an old car, but on one which was built within the past three or four years; a car, by the way, which was widely heralded at the time of its building, because of its light weight and supposedly superior construction. It may readily be seen that cinders and rain will have easy access to the car, which is a rather serious defect, particularly when it is loaded with flour, grain, or similar commodities.

A door which possesses a number of advantages from the standpoint of being cinder and water proof is shown in Fig. 15. It is an application of the Security door to an Atchison, Topeka & Santa Fe box car, and is illustrated, not because there may not be other doors just as good, but because it is used on a car which is better constructed from the viewpoint of protection to the contents than any other which has come to our attention. The U-strip at the end of the door, which fits over the flat strip on the rear door post, prevents any rain or cinders from getting into the car from that direction. It also obviates the necessity of using a burglar proof bottom door shoe or guide. The 1 in. x 2½ in. oak strip, which extends the full length of the door at the bottom, fits underneath the floor strip, which extends 1 in. beyond the side of the car, and forms a fairly dust-proof joint at the bottom. The door laps 1½ in. at the front, and this joint is possibly more open to criticism than any other feature of the door. If the door or the post should warp it might cause trouble, although it is doubtful if any serious damage is caused by the entrance of cinders or rain at this point. The door fixtures at the top of the door are said to have given good results. The precaution has been taken, however, of furnishing the heavy plate clamps at the top of the Z bar where the U-bolts are fastened, which hold the carlines in place.

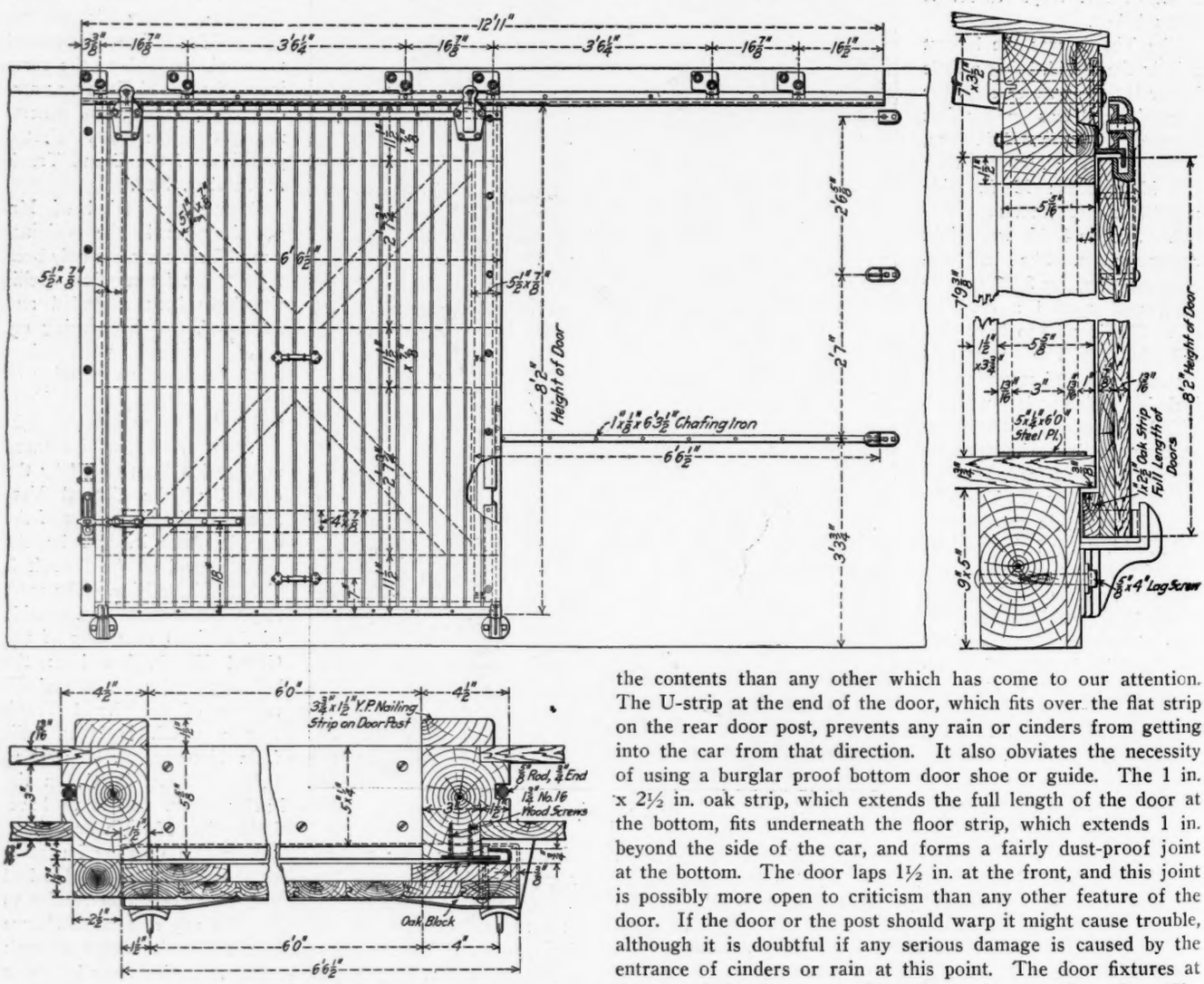


Fig. 15—Application of a Security Door to a Santa Fe Box Car.

A large number of the box car doors, which were examined on different classes of box cars, were found to be more or less badly warped out of shape, making it impossible to keep them in a tight condition, no matter how good the fittings might be. It is the practice on a number of roads to overcome this by placing angle irons, T-irons or wooden strips across the door, as shown

in Figs. 17 and 18. The best practice is to have two of these on each door, as shown, and to make them of metal, as the wooden strips are liable to warp. A Frisco car with a heavy angle near the bottom of the door is shown in Fig. 18. The present practice on that road, however, is to use two such strips, the upper one being placed about the same distance from the top as the lower one is from the bottom. A door with a wooden reinforcing strip is shown in Fig. 26.

Another common defect on box car doors is the splitting of the wooden door posts, as shown in Fig. 19. These views were not taken in the car repair yard, where the worst examples are usually found, but were taken in the freight yard and are typical examples of what can be found almost anywhere. Not only do these defective door posts allow the door to become loose and

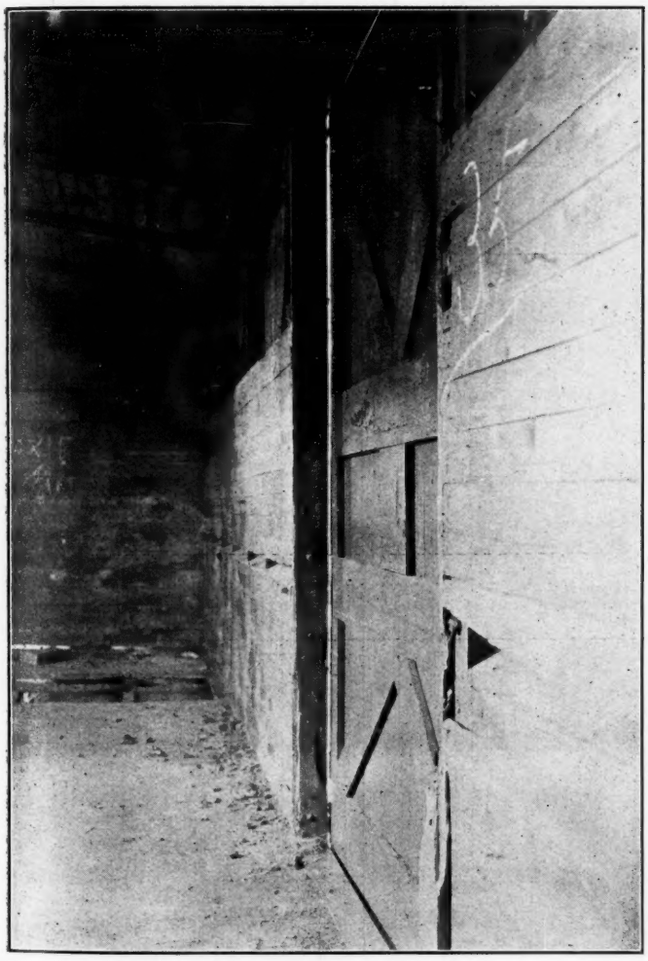


Fig. 16—Note the Cracks About the Door Which is Fastened and Sealed on the Outside.

to be easily pried open, but they are a serious problem from the maintenance standpoint, as they frequently have to be replaced, taking the car out of service and adding to the cost of maintenane. There are several ways of overcoming this, two of which are illustrated herewith. One of them, shown in Fig. 20, is a patented device and consists of a malleable casting which reinforces the door post.

Another scheme, which is used on the Santa Fe 36 ft. 40-ton box cars, is shown in the drawing, Fig. 21. The wooden door post is simply reinforced by a pressed steel angle, 14¾ in. long, 3/16 in. thick, and having legs 2½ in. and 1⅞ in. wide, so as to neatly fit the post. One flange is fitted into the side of the post adjacent to the door, while the other fits underneath the door post. This angle is secured to the door post by two ⅜ in. counter-sunk head bolts in addition to those which hold the post and the lock in place. Note that there is little danger of the door

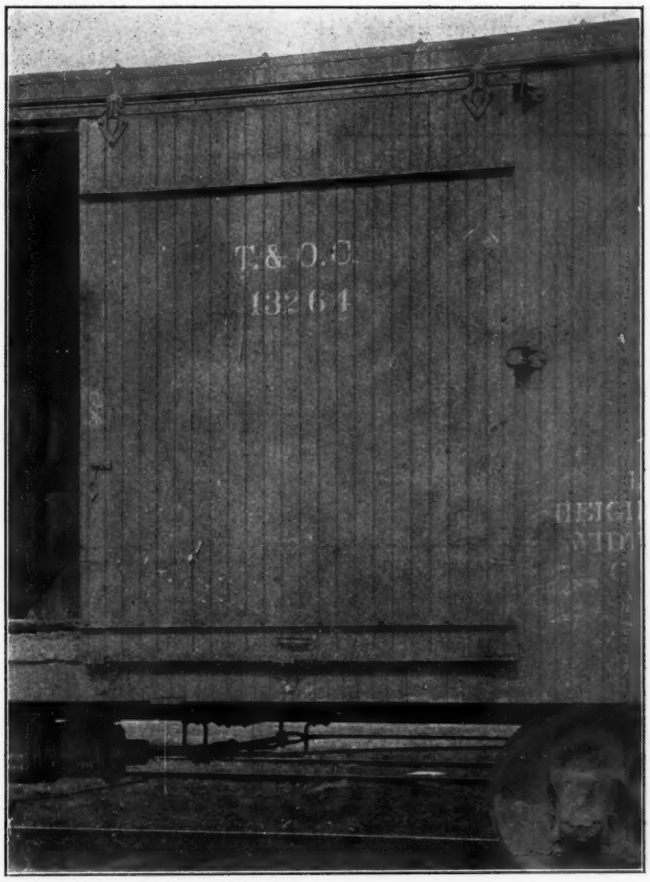


Fig. 17—Car Door Strengthened and Stiffened by Angle Irons.

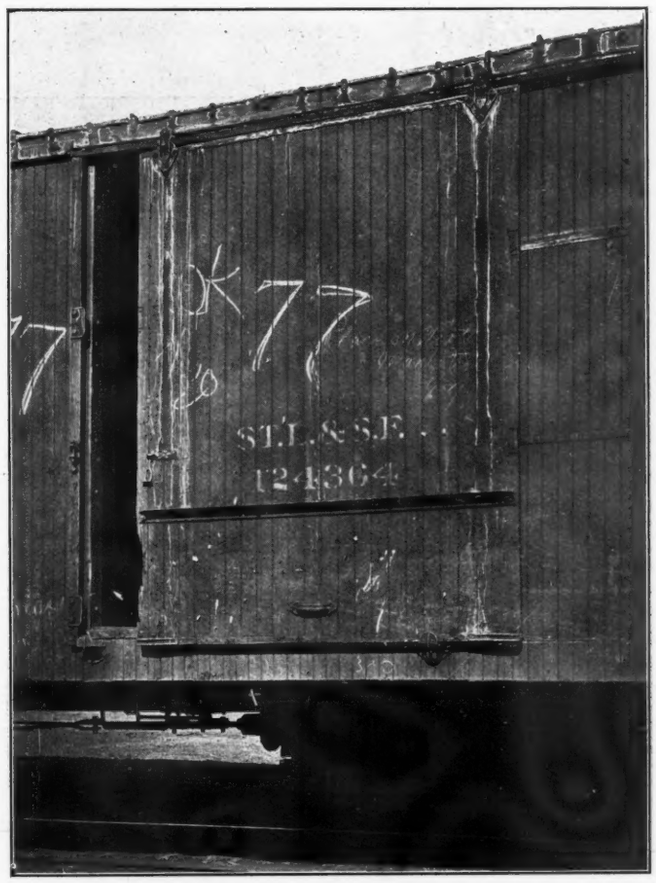


Fig. 18—A Frisco Car Door Reinforced with a Heavy Angle Near the Bottom.

hasp fastening being tampered with, as was described in our issue of April 12, without causing serious damage to the door, and at the same time leaving unmistakable evidence of its having been broken into.

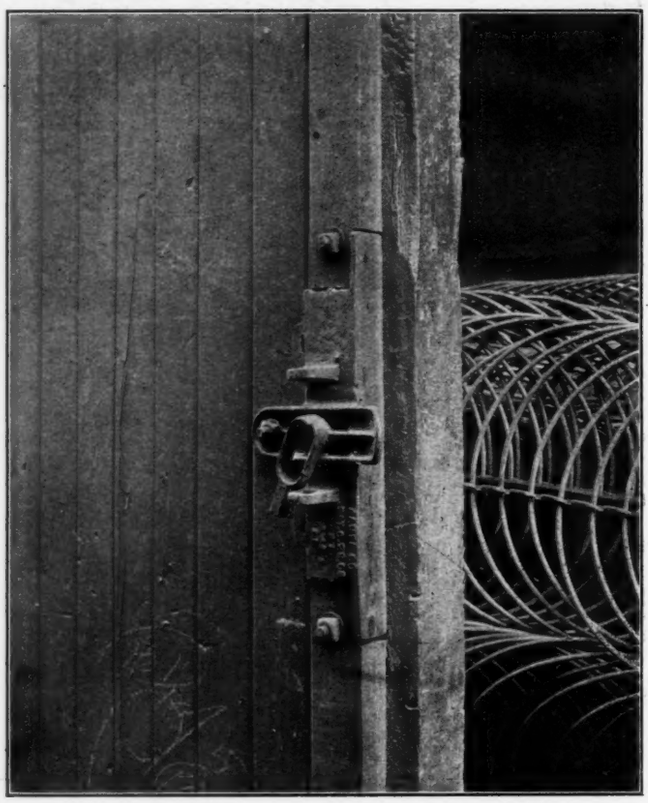


Fig. 20—A Patented Device to Reinforce the Box Car Door Posts.

GRAIN DOORS.

The following data concerning grain claims was developed by the freight claim agent of the Texas Lines of the Missouri, Kan-

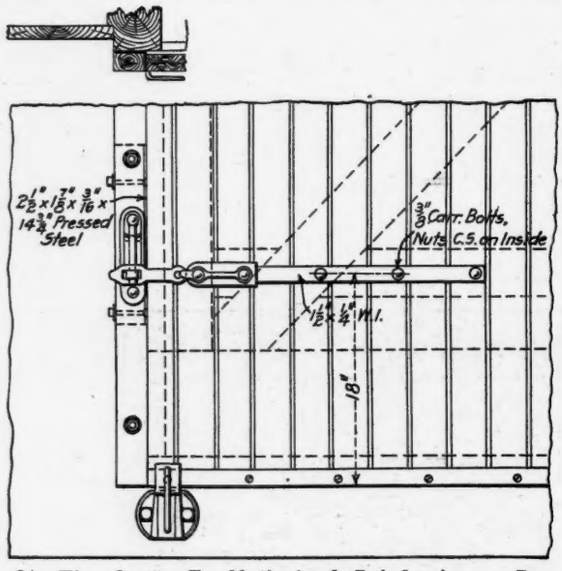


Fig. 21—The Santa Fe Method of Reinforcing a Box Car Door Post.

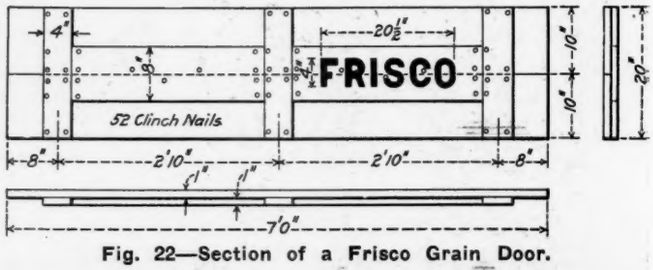


Fig. 22—Section of a Frisco Grain Door.

Fig. 19—Typical Examples of Cracked and Defective Box Car Door Posts.

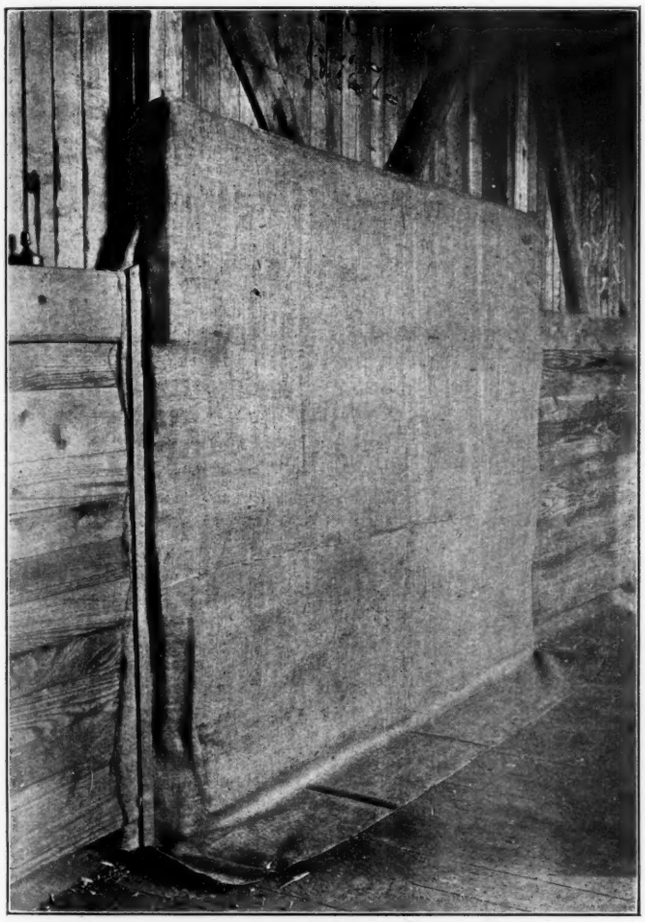


Fig. 23—A Standard Frisco Burlap Covered Grain Door.

sas & Texas. A test inspection was made of 7,429 cars of grain, which were unloaded at the elevator of the Galveston Wharf Company, Galveston, Texas. Of these 4,859, or 67.4 per cent., were found to be leaking grain. About half of the leaks, or exactly 3,281, or 49 per cent. were grain door leaks. The other 51 per cent. were due to other defects.

To eliminate the leakage due to defective grain doors, the Frisco decided to make a radical change in the grain door. The doors formerly used cost from $1.50 to $2 per car, but for several reasons did not seem to give proper protection against the loss of grain. For instance, the nails were not always removed from the door post, thus preventing the grain door from properly fitting against it and permitting a leakage of small grain. The grain doors, although they were of the standard dimensions did not appear to be stiff enough and were often forced outward, allowing the grain to escape. When the grain was unloaded the door went back to its original position and did not appear to be defective. To overcome the difficulty the Frisco now uses grain doors similar to the one shown in Fig. 22. These are made of yellow pine, or well seasoned gum, as specified by the road. There are three battens on one side with cover strips between them, the battens and strips being secured with seven-penny wrought nails. Either two or three boards may be used, but they must be well battened. Three of these sections are used for each door and are nailed to the door post with eight-penny nails. Care is taken to see that they are fitted properly and have no holes in them. Strips of 8-oz. burlap, 8 ft. long and 40 in. wide are then fastened over the grain door, as shown in Fig. 23. The lower strip is allowed to lap over the floor for 10 or 12 in., but is not tacked to the grain door. The top strip laps over the lower one from 6 to 8 in., but must be tacked to the top of the grain door. The wooden strips, which are made of scrap material, are placed over the edges of the burlap (which extend 6 in. on either side of the door) and are nailed to the sides of the car, as shown.

A better idea of the arrangement of the grain doors and bur-

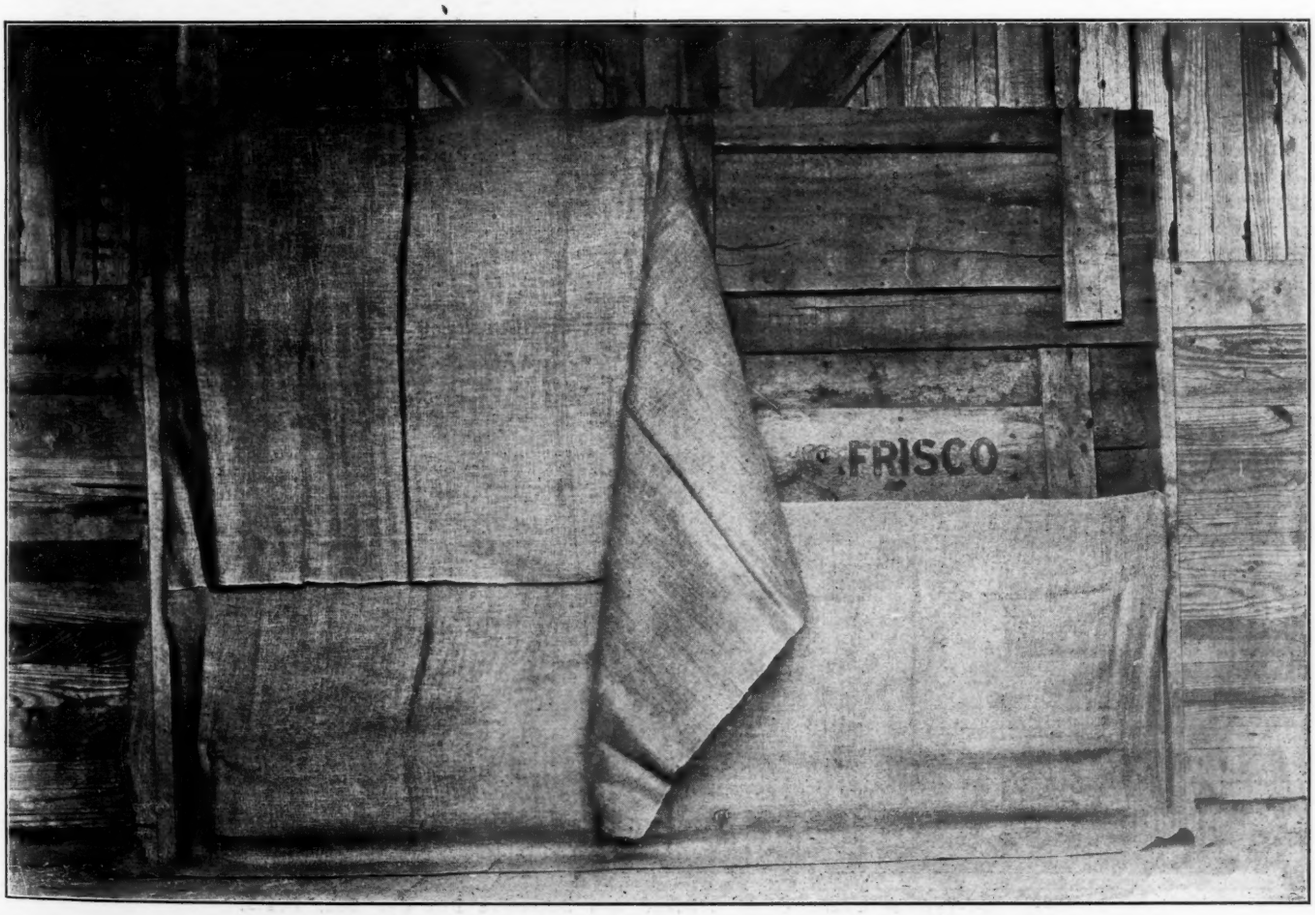


Fig. 24—Application of Burlap to Frisco Grain Door.

lap may be obtained from Fig. 24, which shows one corner of the upper piece of burlap loosened and drawn back, allowing a portion of the grain door to be seen. The burlap should be applied loosely, so that if the grain doors bulge out it will not be torn, but will remain grain proof. The grain doors and the burlap, including the nails and the wooden strips, cost about $2 per car. Each section of the grain door costs twenty-five cents, and usually six of these are required per car. The burlap, including the wooden strips and nails, costs about fifty cents. Some roads use a more expensive wooden door, costing about $.35 per section, or $2.10 per car, but it does not afford as good protection as the cheaper wooden door covered with the burlap.

Where the draft bolt passes up through the floor of the car pieces of burlap 3 ft. long and 40 in. wide are tacked over it. Also when the sides or ends of the car are in such shape that leakage of grain is liable to occur narrow strips of burlap are tacked on the side of the car and lap over on the floor, as shown in Fig. 25.

BOX CAR DOORS AND FLOUR.

It requires very little moisture and cinders to discolor and damage flour which is loaded in white cloth sacks. The average car door will not keep out a driving rain. The Frisco found that even though it might make its own box car doors water and cinder proof it would still be subjected to many claims of this sort, because of flour and mill products being loaded in foreign cars. The following scheme has been devised to make the doors water proof, and has greatly decreased the damages to this class of lading. The mills are furnished with water proof asphalt paper, wooden strips, nails and wooden wedges, and are asked to place them on the car at their own expense, as shown in Fig. 26. The water-proof asphalt paper is used in preference to tar paper, because the odor of the latter might damage the flour. A wedge is driven between each door shoe and the door, requiring two wedges for each door, or four for the car. This forces the door tightly against the side of the car, tending to prevent the rain and snow from entering. Strips of the asphalt paper, 11 in. wide, are then placed over the joint at the sides of the door and are held in place by thin strips of wood, which are nailed over the paper. The paper is not drawn tight, but is left loose, so that the distortion of the car and the door while in motion will not tear it.

The strips are sawed from scrap lumber at the company's shops. The cost is, therefore, nominal, including only the labor and the cost of the nailing. The wedges are also made from scrap material; they are necessary because doors were found which had from ¼ in. to 2 in. of play while the car was in motion, thus tearing the paper. The cost of the paper, nails and strips is only about twelve cents a car. The mills in most cases have been very glad to co-operate with the railway, and the flour claims have been practically eliminated on cars fitted up in this way.

Fig. 26—Frisco Method of Making Box Car Doors Tight for Carrying Flour.

Other precautions have also been taken in connection with the loading of flour, which will be considered in another part of this series of articles in connection with leaky roofs and sides of cars.

(To be continued.)

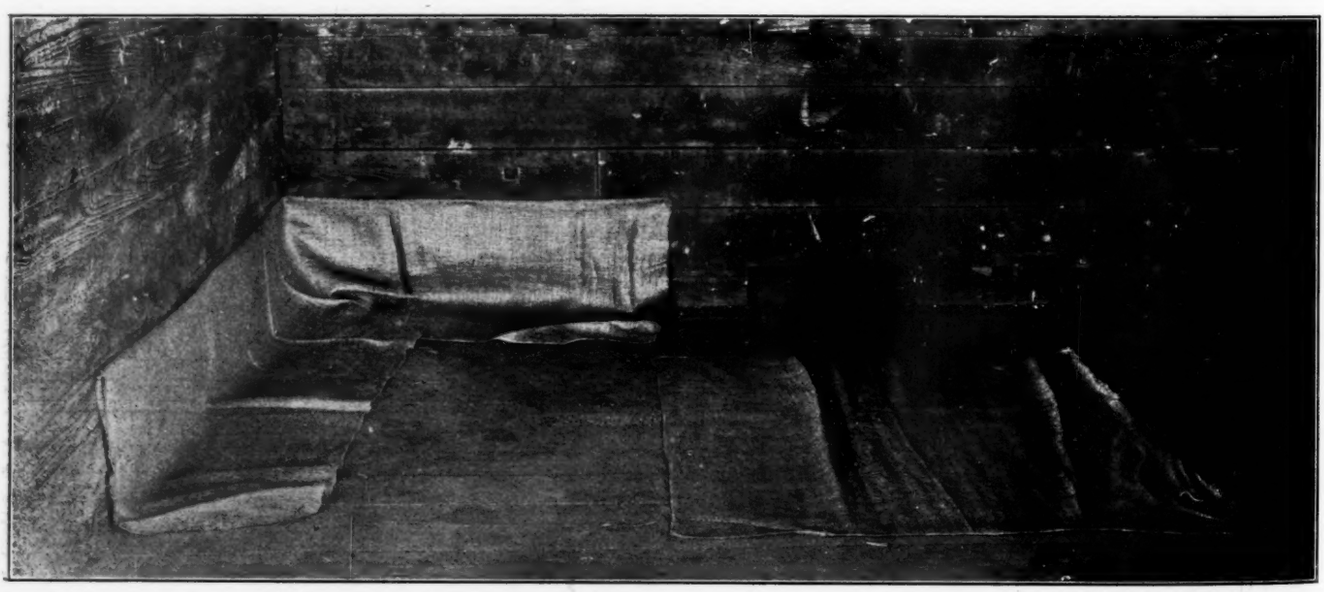


Fig. 25—Burlap as Applied to Prevent Leakage of Grain at King Bolt and Defective Sides or Ends of Car.

THE COST OF WORKMEN'S COMPENSATION TO THE RAILWAYS.

Edward Bunnell Phelps, editor of *The American Underwriter*, has issued a pamphlet reprinted from an article in that publication on the probable cost of workmen's compensation to the community and to various industries, based on the provisions of the proposed bill for the protection of interstate railway employees recommended by the United States Employers' Liability and Workmen's Compensation Commission, now pending before Congress, and the draft of a bill proposed by the National Civic Federation. Mr. Phelps calculates that from the voluminous report recently filed by the commission in connection with its bill, it is now for the first time possible to work out a reasonably specific estimate of what such a plan of workmen's compensation would cost in the case of the railways of the country, and that as railroading is conceded to be an exceptionally hazardous occupation, a safe maximum figure for the loss cost of the plan in the case of mechanical and manufacturing industries in general is thus made available.

From the data collected by the commission as to the previous experience of the railways in compensating for accidents, Mr. Phelps estimates that under the proposed bill the annual increase in cost to all the railways of the United States would be less than $2,750,000. The methods by which he has obtained this figure with reference to the railways are fully explained in the following excerpts from the article:

"Through the many courtesies of the chairman of the United States commission, Senator George Sutherland, of Utah, I have been able to obtain the text of the commission's report fresh from the presses of the government printing office. There are 8 pages of tables, closely set in small type, and the tabulations dealing with a total of 2,641,715 employees for three years are equivalent to a three-year record of 880,572 men, and 'represent the experience of railway companies operating approximately one-half of the total railway mileage of the United States, employing nearly 57 per cent. of all railway employees, excluding officers, and paying 59.3 per cent. of the wages of all railway employees, excluding officers, and cover the three years of 1908, 1909, and 1910.' Surely, so broad a tabulation of the industrial accident experience of American railway employees is fairly representative of the industry as a whole.

"I have endeavored to condense into the two tabulations hereafter given the real essentials for the purposes of this paper of all the 81 pages of tables actually presented in the commission's report. Table 1 summarizes the three-year accident and compensation experience of the railways employing nearly 57 per cent. of all the railway employees of this country, officers not included; and Table II presents a detailed analysis of that experience. In both cases the employees are grouped in five classes, Class A including those earning $125 and upward a month, Class B, those earning from $100 to $125 a month; Class C, those earning from $75 to $100 a month; Class D, those earning from $50 to $75 a month, and Class E, those earning less than $50 a month. With the figures thus grouped, the tabular summaries which I have compiled from the many tables in the commission's report are as follows:

TABLE I.—A SUMMARY OF THE ACCIDENT AND WORKMEN'S COMPENSATION EXPERIENCE OF MORE THAN ONE-HALF THE TOTAL NUMBER (57 PER CENT.) OF AMERICAN RAILWAY EMPLOYEES FOR THE THREE YEARS, 1908-1910.

Wage Class.	Number of Employees (3 years).	All Accidents (disabling over 2 weeks). Number.	All Accidents (disabling over 2 weeks). Rate per 1,000 Employees.	*Compensation Cost (3 years). Settlements and Judgments.	*Compensation Cost (3 years). Expense of Administration.	Payroll (3 years). Aggregate.	Payroll (3 years). Annual Average Earnings.
Class A	125,724	4,726	37.59	$2,235,152	$388,417	$209,105,090	$1,663
Class B	189,202	9,625	50.87	3,052,441	616,708	226,938,448	1,199
Class C	386,670	19,868	51.38	5,128,272	1,185,750	355,223,518	919
Class D	870,185	28,631	32.90	4,465,612	1,269,074	606,403,633	697
Class E	1,069,934	25,632	23.95	3,059,154	1,245,637	435,643,909	407
Totals	2,641,715	88,482	33.49	$17,940,631	$4,705,586	$1,833,314,598	$694

*Total of amounts paid and amounts estimated for outstanding cases.

TABLE II.—A DETAILED RÉSUMÉ OF THE NUMBER, RATIO AND COST OF FATAL ACCIDENTS, PERMANENT TOTAL DISABILITIES, PERMANENT PARTIAL DISABILITIES, AND TEMPORARY DISABILITIES, IN EACH CLASS OF AMERICAN RAILWAY EMPLOYEES FOR THE THREE YEARS, 1908-1910.

Injuries.	Class A.	Class B.	Class C.	Class D.	Class E.	Total.
Fatal Accidents—						
Number of deaths	417	721	1,414	1,510	1,886	5,948
Ratio per 1,000	3.32	3.81	3.66	1.74	1.76	2.25
*Compensation paid	$1,200,614	$1,261,094	$1,923,524	$1,710,632	$1,168,914	$7,264,778
Average payment	$2,879	$1,749	$1,360	$1,133	$620	$1,221
Annual payroll cost	.574%	.556%	.541%	.282%	.268%	.396%
Annual per capita cost	$9.55	$6.66	$4.97	$1.97	$1.09	$2.75
Permanent Total Disabilities—						
Number of cases	15	48	81	71	64	279
Ratio per 1,000	.12	.25	.21	.08	.06	.11
*Compensation paid	$56,652	$277,808	$413,470	$256,132	$178,216	$1,182,278
Average payment	$3,777	$5,788	$5,105	$3,607	$2,785	$4,238
Annual payroll cost	.027%	.129%	.116%	.042%	.041%	.065%
Annual per capita cost	$0.45	$1.47	$1.07	$0.29	$0.17	$0.45
Permanent Partial Disabilities—						
Number of cases	115	344	764	730	689	2,642
Ratio per 1,000	.91	1.82	1.98	.84	.64	1.00
*Compensation paid	$330,557	$632,049	$1,263,887	$874,695	$604,815	$3,706,003
Average payment	$2,874	$1,837	$1,654	$1,198	$878	$1,403
Annual payroll cost	.158%	.279%	.357%	.144%	.139%	.202%
Annual per capita cost	$2.63	$3.34	$3.27	$1.00	$0.57	$1.40
Temporary Disabilities (over 2 weeks)—						
Number of cases	4,179	8,512	17,609	26,320	22,993	79,613
Ratio per 1,000	33.24	44.99	45.54	30.25	21.49	30.14
*Compensation paid	$647,329	$881,490	$1,527,391	$1,624,153	$1,107,209	$5,787,572
Average payment	$155	$104	$87	$62	$48	$73
Annual payroll cost	.310%	.388%	.430%	.268%	.254%	.316%
Annual per capita cost	$5.15	$4.66	$3.95	$1.87	$1.03	$2.19
All Deaths and Disabilities—						
Number of cases	4,726	9,625	19,868	28,631	25,632	88,482
Ratio per 1,000	37.59	50.87	51.38	32.90	23.95	33.49
*Compensation paid	$2,235,152	$3,052,441	$5,128,272	$4,465,612	$3,059,154	$17,940,631
Average payment	$473	$317	$258	$156	$119	$203
Annual payroll cost	1.069%	1.345%	1.444%	.736%	.702%	.979%
Annual per capita cost	$17.78	$16.13	$13.26	$5.13	$2.86	$6.79

*Total of amounts paid and amounts estimated for outstanding cases.

"As will be noted by reference to Table II, the compensation for accidents actually paid in the three years 1908-1910, in the form of both judgments and mutually-agreed settlements, by the railways employing more than one-half of all railway workers in this country, averaged $1,221 for fatal accidents, $4,238 for permanent total disabilities, $1,403 for permanent partial disabilities, $73 for temporary disabilities, or $203 for all of the 88,482 accidents of all kinds figuring in the returns. The total compensation paid amounted to .979 per cent. of the annual payroll of the 880,572 employees in question, or an annual per capita cost of $6.79. If the expenses of administration, including nearly $1,250,000 of court costs and attorneys' fees, were to be added to the compensation paid, the aggregate cost to the railways in question of workmen's compensation in the three years 1908-1910 was $22,646,217, or 1.24 per cent. of the total payroll of $1,833,314,598, or an annual per capita cost of $8.57.

"The figures on which these showings are worked out, dealing with about 59.3 per cent. of the wages of all railway employees in this country, officers excluded, presumably the total annual cost of the system in question of workmen's compensation, exclusive of administration expenses, for all the railways of the United States, would be $10,084,672, or $12,729,745 if administration expenses were to be included. The United States commission calculates that the enactment of the bill introduced by it would increase the compensation cost by about 25 per cent., and thus bring the total annual output for workmen's compensation of practically all American railways up to approximately from $12,000,000 to $13,000,000. This would mean an annual compensation cost of about 1.22 per cent. of the payroll, or about 1.54 per cent. of the payroll for both compensation and administration expenses should the administration expense ratio remain the same as formerly. Of course, the last-named possibility is extremely remote, as one of the fundamental purposes of the workmen's compensation movement is to practically eliminate the heavy court costs and attorneys' fees involved in the litigation of industrial accident claims. In any event, it would therefore seem to be safe to assume that the outside annual cost of both compensation and administration expenses to the railways of the plan recommended by the commission would not exceed 1.5 per cent. of the payroll.

"It seems to me that this process of reasoning establishes a bed-rock figure for the probable outside cost to American industries in general of even such an extremely liberal workmen's compensation act as that which Congress is now considering. And the bill in question, mark you, provides for compensation for all occupational accidents to railway employees disabling for over two weeks, and not self-inflicted or resulting from intoxication while on duty; for as high as fifty per cent. of the victim's wages for eight years in some cases for fatal accidents; for fifty per cent. of the injured man's wages for the remainder of his life in case of total permanent disability; for fifty per cent. of the wages for anywhere from four months to six years in the case of specified permanent partial disabilities; and for fifty per cent. of the wages for temporary total disabilities. Apparently even a system of compensation so liberal as this would not cost the railways at the outside, expenses included, over 1.5 per cent. of their annual payroll.

"The cost in 1908-1910 of the present system of compensation for occupational accidents, administration expenses included, having amounted to 1.24 of the payroll, or $22,646,217, an increase to a cost of 1.5 per cent. would mean an actual total increase in three years of less than $5,000,000 to the railways whose returns figure in the preceding tabulations, or an annual increase of a trifle less than $2,750,000 for all the railways in the United States. This fact would seem to demonstrate conclusively the absurdity of the cry heard in some quarters, that the introduction of workmen's compensation would prove ruinous to the great industries of this country.

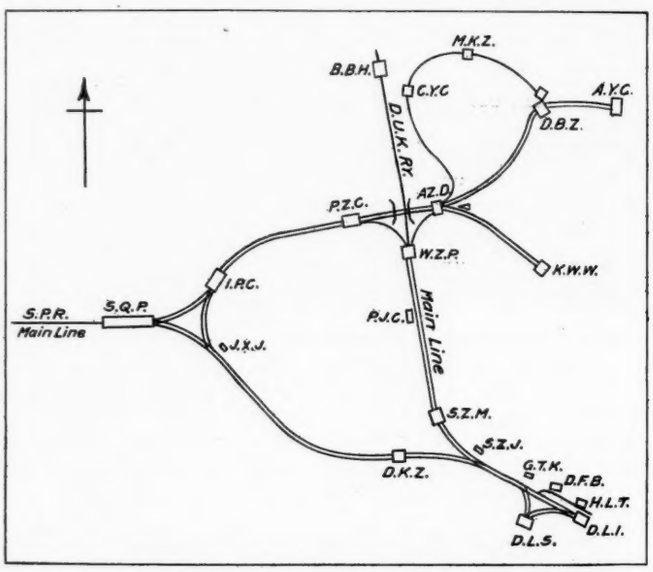
"A complete shift to the public by American railways of the entire presumable cost of the United States Commission's plan of workmen's compensation, as the Commission figures it out, would add 89/100 of 1 per cent. to the operating expenses of the railway service of this country—had not a large part of the cost already been included in their expenses for the last three years. Even if the entire 89/100 of 1 per cent. were to be added, and the cost evenly distributed all along the line, the man who had been paying $50 for a railway ticket, or for the use of a freight car, would be asked henceforth to pay precisely $50.45 for that same service."

HANDLING THE TRAFFIC AT THE DELHI DURBAR.

BY LEWIS R. FREEMAN.

Neither in rolling stock, in the shops, nor yet in their systems of management do the railways of British India reflect American influence; considering which it will be of especial gratification to American railway men to learn that the success—I may, indeed, term it a triumph without exaggeration—of handling the enormous traffic incident to the late Delhi durbar is largely credited to an improved American system of despatching—the A B C system—an innovation which was looked upon with many misgivings by those not familiar with it, but which, nevertheless, stood the test of one of the most intense rushes in the history of world railroading.

The Curzon durbar of eight years ago, while a pronounced success from a spectacular standpoint, was a chaos on the score of management, and especially that of transportation; the late



Delhi Durbar Railway; Broad Gage Lines.

durbar, profiting by the mistakes of its predecessor, was made an absolute military marvel of management, and the masterly handling of the great volume of extra traffic is generally credited with being the principal factor in this most felicitous consummation.

"I believe," said Sir Henry Burt of the Northwestern Railway, in a conversation I had with him in Lahore a short time ago, "that the preparations we made for handling the durbar traffic were quite without precedent for an event of the kind. In America and Europe greater trackage and more elaborate terminal facilities have been provided for several of the great expositions which have run for six or eight months, but, to my knowledge, nothing so complete as our installation has ever been attempted for an event lasting but ten days."

This is undoubtedly a well-advised and conservative statement, and to it I may add that at no one of the great American expositions of the last two decades, not even that at St. Louis, have the extra railway facilities—both trackage and stations—been

constructed with so much of an appearance of permanence and borne so little of the suggestion of "makeshift."

The problem presented for solution to those in charge of the durbar traffic arrangements was practically unique. Delhi is situated 900 miles to the northwest of Calcutta and the same distance northeast of Bombay, the two points from which the greatest streams of traffic were to come. The city, which is a kind of clearing house between the rich and fertile Punjab and the eastern and western coastal ports of India, is served, directly or indirectly, by a half dozen railways, and, in normal times, has ample station and track facilities. The population—225,000—is almost exclusively native, the permanent civilian European residents probably not exceeding a hundred or so. There are but three or four small hotels, and at ordinary times a hundred tourists, arriving unannounced, would have difficulty in finding comfortable accommodations. It was upon such a place that the durbar was to result in the sudden dumping—no other term so well describes the precipitancy of the invasion—of 200,000 people, more or less, all of whom must be housed and fed and entertained for ten days and then, even more suddenly than they were brought, be picked up and carried away again.

The difficulty of the transport problem arose from the character of the gathering rather than from the mere size of the crowd to be handled. The East Indian Railway annually puts down at, and takes away from, Allahabad over a million people for a single Hindu festival in January, and this so smoothly that the casual traveler by that ably-managed line would hardly be aware that anything greatly beyond the normal traffic was being handled. But these pilgrims, for the most part, are third class passengers, carrying the greater part of their luggage on their heads or under their arms. The durbar involved the actual creating of a city covering 25 square miles, to be almost, if not quite, as densely populated as the average American or European city of the same number of inhabitants. Moreover, it was to be a city of palaces—canvas palaces, to be sure, but not any the less splendid in the elegance and comfort of their interiors.

The site of the durbar camp was a bare and treeless plain to the north of the city, and all that could be done on the spot in the way of beautification was to grade the roads and drives and seed down the lawns; everything else that went to make up this marvelous ten-day city had to be brought by train or by cart from a distance. The potted chrysanthemums for the gardens of a single one of the hundred or more camps of the native princes could not be carried on a single goods train, and the 2,000 motors in use during the durbar must have required a score or more of specials. All of the provincial camps were small towns in themselves, often covering close to a quarter of a mile square, and having their own ball, billiard and reception rooms and wide drives and spacious lawns.

Titanic as was the task of building up the great camp itself, it was not there that the real rub was to come, for most of that work could be extended over weeks if not months; nor yet was it in the bringing in of the fifty thousand soldiers, this being a comparatively simple piece of unrushed mobilization and concentration. It was in the handling of the great streams of passenger traffic on the days immediately preceding and following the durbar that the real test of the transportation facilities was to come, the times at which there was such hopeless chaos at the Curzon durbar.

The king, the viceroy, and the governors and lieutenant-governors were to come in specials; likewise several score of the native princes, while a large part of the tourist influx was to be handled in extra trains routed direct to the durbar camp. Long before the durbar the railway people were confronted by the appalling problem presented by the certainty of having to send well over a hundred trains a day into Kingsway (the main durbar camp station), where the maximum number that could be handled using the regular Indian "line-clear" [manual block] system, with the utmost facilities practicable to provide, was about eighty. It was at this juncture that Major H. F. E. Freeland R. E., of the Northwestern Railway and traffic manager of the Delhi Durbar railway, came forward with a proposal to install a system of despatching by telephone, similar to one he had observed while traveling in America several years ago.

The amazing smoothness with which the railway traffic—which turned out even heavier than had been anticipated—was handled was one of the marvels of the durbar, and how much of this success was due to the new system of despatching may be gleaned from the following extract from a letter which Major Freeland has courteously written me on the subject.

"I am pleased to hear that you were interested in my control station at Kingsway. Without it we could never have handled the extremely heavy traffic offered to us, and by us, through three big junctions—Delhi Main, Delhi Sadar and Shakurpur, to say nothing of the minor junction of Dazirpur.

"That the control system adopted here has enabled us to handle 170 trains in 19 working hours, between Delhi and Brewery Cabin, as against the maximum previously attained of 84 trains in the same time, speaks for itself. The great advantage of the system lies in the fact that we have absolutely reliable visual indication [on the train sheet] of the position of any train at any moment, and knowing the running time between stations or signal boxes, the control operators have thus been enabled to take intelligent action to move the traffic under the varying conditions inseparable from all railway working. Normally Indian railway trains are worked from station to station by "line clear," or by some electrical substitute therefor, and when once a train leaves a junction its subsequent movements are, in this country, dependent on the idiosyncrasies of the Indian station master at each point, uncontrolled by European supervision.

"While in America in the winter of 1908 I was enabled, by the courtesy of Mr. W. H. Boardman, editor of the *Railway Age Gazette,* to pay a visit to Spokane, where I found in operation a system of train operation evolved by Mr. A. Beamer, superintendent of the Northern Pacific, which system is practically a combination of the American train despatcher and our Indian line clear system. It is called by Mr. Beamer the A. B. C. system, on account of its simplicity, I presume. This system I have elaborated, with the assistance of Mr. E. A. Scott, signal engineer, Northwestern Railway, and although our telephone arrangements have been somewhat out of date, the train movements accomplished and controlled have far transcended even my hopes. I can say, without undue boasting, that if the control had not been established we could not have dealt with the traffic, and I must add that I owe all the success attained to the loyal co-operation of the control and operating staff. The system is to be adopted on certain single lines with heavy traffic on the Northwestern Railway, and I understand that other prominent Indian railways are also favorably impressed."

In addition to the control system of which Major Freeland writes so enthusiastically, a measure which operated strongly to prevent confusion in the great rush of departure was a hard-and-fast rule requiring that, unless absolutely necessary, no one of the almost countless specials should be broken up after its arrival. Many miles of siding were built to accommodate these trains, and there they were stabled until their schedule time of departure arrived, thus completely avoiding the delays and confusion of the endless shunting which would otherwise have been imperative.

Another rule which was an important factor in preventing at Kingsway the appalling congestion so characteristic of Indian station platforms when there is any rush of passenger traffic, was that requiring that all luggage should be removed within half an hour of its arrival. In America, where one may obtain anything he desires at a few moments' notice by simply calling up and asking for it on a telephone, a man may—and often does—set out and travel across the continent and back with nothing but a hand bag. In India, where one must often carry with him everything from knives and forks to bed, tent and bath tub, one rarely leaves home for over night without taking with him a small mountain of luggage. As there are no regularly author-

ized transfer companies, luggage means coolies, and coolies mean confusion; and a stranger will find that he has never realized the meaning of that word until he has seen an Indian railway platform. Lines of coolies mix and mingle, mountains of luggage topple over upon each other, and, with every other coolie watching his chance to make off with a package on his own account, one is lucky indeed if he emerges from the melee with everything that he took into it. It is a common saying in India that visitors to the Curzon durbar are still engaged in trading back their mixed up luggage.

The cool shaded platforms and the roomy, comfortable waiting rooms are largely responsible for the confusion in stations at rush times—through making it convenient for passengers to take ten or twelve hours in getting away. By the simple expedient of providing very spacious but unshaded platforms, doing away entirely with waiting and parcel rooms, and requiring that luggage should at once follow its owner out of the station this annoying difficulty was obviated to such an extent that one found elbow room at Kingsway at the times of the heaviest rush. The handling of the durbar traffic was an illuminating example of what sane, intelligent prevision can accomplish, and to me it has been one of the most interesting features of the great gathering.

In addition to its broad gage line connecting with the several trunk lines to Delhi, the Durbar Railway Company built and operated nine miles of double track narrow gage line on which was shouldered the bulk of the local passenger traffic between Delhi and the camp, and between the various points within the camp. The track materials were lent by the Indian government, and were drawn from the large stock that is kept ready along the Northwestern frontier against the time when it will be necessary to throw a British army into Afghanistan. The construction work was thoroughly and expeditiously performed by companies of miners and sappers from the army, who demonstrated their ability as practical and efficient railway builders by their quick work. The main branch of the line was practically stone ballasted throughout, and the one over-bridge, where the great thoroughfare called the mall was crossed, was an unusually solid piece of construction. It is the largest piece of work on the line and necessitated great labor throughout the hot weather in rock cuttings and embankments along the top of a ridge, with an interlocked junction and signal cabin at Ridge Junction. The bridge itself is 60 ft. span double pin Warren girders, to carry the two tracks, with a ten-foot pathway on the north side of the road; and is built with quarried stone abutments and pier.

From the nature of the work of this line—that of carrying passengers for short distances—grade crossings could not be avoided, and on one branch of the line there were 20 of these, and on the other 21. A hundred soldiers and fifty coolies were on duty at the crossing gates, and so efficiently was their work done that not a single accident is recorded. At two of the stations overhead crossings were provided, and a soldier was on hand at each side to see that they were used. The stations were small but well constructed of brick, and at several of them attractive lawns and gardens were laid out and kept up.

The comfort of the passengers was heightened by the use of coke as fuel on the engines, and by the thorough oiling of the track. The rolling stock, like the track, came from the frontier, and though the cars were small and the seats hard, the train proved preferable to all other means of conveyance on account of the congestion of traffic on the streets. The fare for any distance was one rupee (32 cents) for first-class passengers, and four annas (8 cents) for the lower class, with higher charges for passage on special occasions. This little line proved very useful in relieving both the main lines and the wagon roads of much burdensome traffic, and I shall not be surprised to hear that it has paid for itself and left a handsome surplus.

Since the decision of the government to move the capital of India to the site of the durbar camp has been announced orders have been issued that nothing is to be done for the present toward removing the railways that were built to serve the camp, and there would seem to be little doubt that the Delhi Durbar Railway will become a permanency and play quite as important a part in the creating of the new capital as it did in making a success of the record-breaking coronation durbar of 1911.

The broad gage lines of the railways are shown in the accompanying sketch, not drawn to scale. The distance D. K. Z. to J. X. J. is 3 miles; from I. P. C. to P. Z. C. 1¼ miles. At the most important signal cabins four operators were employed, their periods of service being six hours each. A temporary book of rules was issued in which provision was made for the use of the simple manual block system in case the communication with the despatcher (controller) should be cut off. Each order of the controller was verified by cipher, the cipher word being the last in each order.

TECHNICAL MEN IN THE CAR DEPARTMENT.

The necessity of giving more attention to the car shop apprentice was discussed in an editorial in the *Railway Age Gazette* of March 15, 1912, page 463. J. T. Wallis, general superintendent of motive power of the Pennsylvania Railroad has furnished the following information concerning the car shop apprentice course on that system:

"We have in the car department an apprenticeship leading to the trade of car builder. In addition, our first class regular apprentices at the Altoona machine shops, who are graduates of high or manual training schools, spend five months of their course in the car shops, and the special apprentices, who are appointed from among the graduates of technical schools, spend seven months there, their time being divided between the passenger car shop, steel freight car shop, cabinet shop, outside repair tracks and car inspecting.

"Applicants for appointment as special apprentices must be graduates of technical schools and under 25 years of age at the time of appointment. A man desiring to apply, fills out one of our standard application blanks and sends it to us accompanied by his photograph. If, on looking over his application, he appears to be eligible, we ask him to come to Altoona in order that we may have an interview with him and show him through the shops, after which his name is placed on our list, from which, each year, we select a limited number of applicants. Priority of application has some weight, but we reserve the right to select from our list those applicants who impress us as being the most desirable.

"The rates of pay per hour of the special apprentices and the time spent in each shop are as follows: First year, 17.9 cents; second year, 20.6 cents; third year, 23.1 cents; fourth year, 25.7 cents. The time in the various shops is distributed as follows:

Erecting shop	6 mos.	Boiler shop	1 mo.
Machine shop No. 1	4 mos.	Electrical department	3 mos.
Miscellaneous shop	1 mo.	Engine house	4 mos.
Machine shop No. 2	2 mos.	Firing	3 mos.
Air brake shop	2 mos.	Store house	1 mo.
Blacksmith shop	1 mo.	Shop clerk's office	2 mos.
Iron foundries	2½ mos.	Motive power clerk's office	1 mo.
Car shops	7 mos.	Special duty	7 mos.
Brass foundry	½ mo.		
		Total	48 mos.

Practically all of our master mechanics have had some experience in the car department."

Another large railway reports that in the summer time it is obliged to lay off large numbers of shop men on account of the lack of work, especially after the winter work of repairing, painting and cleaning passenger equipment ready for the excursion season is over. It is difficult, therefore, to add to the payroll in the summer season. The superintendent says, "We have no objection to employing college graduates provided they intend to stay and go to work the same as the rest of us. Our experience has been that the special apprentices we have taken care to educate have not remained with us, and I have not found that any of them want to go into the car department, as they have larger ideas in the way of advancement."

Maintenance of Way Section.

THE warm weather of the past two weeks has stimulated spring track work, and preparations are being very generally made to begin the heavier work of the season. One roadmaster on a main line district near Chicago already has four steel gangs relaying rails, and gangs are being put on all over the country. A discussion of the proper organization and use of extra, or floating, gangs is, therefore, most timely now. If the best results are not being secured a discussion of the reasons and means of overcoming them will be valuable. The experiences of those who have changed the handling of their gangs in some way with good results may be instructive to others. Those planning to send contributions to the contest on the extra gang problem, which was announced in our issue of March 15, should do so promptly, as contributions must be received not later than April 25 in order to be considered by the judges. We will pay $25 for the best and $15 for the second best papers submitted on this subject, while others accepted and published will be paid for at our regular space rates. All contributions should be sent to the civil engineering editor of the *Railway Age Gazette,* 417 South Dearborn street, Chicago.

THE next contest will be on Bridge Kinks, and will include kinks of any kind applicable to either maintenance or construction work in the bridge department. Those kinks relating to bridge and concrete work which were excluded from the construction kink contest last fall are eligible at this time. A description of any method or device which will prove economical of either time or money, and connected with the construction, maintenance or repair of either permanent or timber bridges, will come within the limits of this contest. The construction of concrete piers or arches in isolated places where it is difficult to install extensive equipment, or where it is not economical to do so because of the limited amount of work to be done, frequently afford opportunities for much ingenuity. The unusual floods of the past few weeks in several parts of the country, which have washed out many bridges and sections of track, have given rise to many kinks of another kind. The repair or renewal of structures under traffic also introduces complications and the necessity of doing work between trains frequently renders the adoption of special methods necessary. These suggest but a few of the many kinds of kinks used in the bridge department, and it is hoped that our readers will send them in for publication. We will pay $25 for the best and $15 for the second best kinks submitted, and will pay our customary space rates for other contributions accepted and published. All contributions must be in the hands of the civil engineering editor of the *Railway Age Gazette,* 417 South Dearborn street, Chicago, not later than June 25.

STUDIES of various phases of the economics of maintenance labor have been assigned to the committees on Track, Roadway, and Signals and Interlocking of the American Railway Engineering Association, as mentioned elsewhere in this issue. Although the increasing importance of this subject has been realized by a majority of the officers and members of the association, active interest was focused on it by the recommendation of L. F. Loree, president of the Delaware & Hudson, in his address prepared for the recent annual dinner of the association. Mr. Loree pointed out that of the $300,000,000 annually spent for maintenance of way in this country, about 56 per cent. is paid to labor, and his specific recommendation was that a committee on Maintenance of Way Labor be created to "investigate the conditions of employment of, and the relation of, maintenance of way labor to, reasonable supply and demand; and to consider questions of economic organization, education, discipline and equipment of forces for various kinds of work." The Board of Direction has decided to divide this study among three committees already established whose work is most closely connected with the labor problem rather than to create a new committee to study labor alone. The rank and experience of the members of these committees make them well fitted to handle the subject, and their reports should prove as valuable as any ever presented to the association.

SPECIAL attention is called to the article by Mr. Morse on Rail Failures Due to Eccentric Loading, which is printed in a preceding part of this issue of the *Railway Age Gazette,* rather than in the Maintenance of Way Section, because of its interest to mechanical as well as operating and engineering men. The point raised by Mr. Morse, that many rail failures are due to the eccentric loading resulting from the coning of the wheels, is worthy of careful consideration now, when the entire subject of rail failures is receiving so much attention. With the heavy service now required of rails, it is not advisable to increase the loads on them any more than is necessary; and unless some definite benefit is gained by the present coning of the wheel it would appear best to deliver the load from the wheel as nearly as possible over the center of the rail. That the advantage derived from coning the wheel is largely a theoretical one is attested by an examination of wheels after a short time in service. In this connection it is interesting to note in Forney's Catechism of the Locomotive, 1911 edition, the statement that the conical form of the wheels does not have much influence on their action on curves, as the axles of the two pairs of such wheels are held parallel to each other in a truck frame; also, as the influence of the conical form of the wheel diminishes as the distance between the axles increases, the effect of the coning is almost if not quite inappreciable. A conference between the proper committees of the Master Mechanics', the Master Car Builders' and the American Railway Engineering Associations to discuss the necessity for the coning of the wheels, as well as the proper curve for the top of the rails, might result in beneficial changes in both.

THE contest on the Section Foreman Problem, which has just closed, was the most successful one conducted thus far in the Maintenance of Way Section, both in point of the number of contributions received and the quality of the material in the contributions. Because of the large number of papers sent in the work of the Judges, H. G. Hetzler, president Chicago & Western Indiana; H. J. Slifer, general manager, Chicago Great Western, and E. P. Bracken, assistant general manager, Chicago, Burlington & Quincy, was more than usually difficult. After a careful study of the papers they awarded first prize to A. E. Hansen, roadmaster Atchison Topeka & Santa Fe, Topeka, Kan., and second prize to George E. Lowe, supervisor Delaware, Lackawanna & Western, Elmira, N. Y. Other papers were received from Sam Lincoln, roadmaster G. C. & S. F.; Temple, Tex.; L. W. Strayer, maintenance of way department B. & O., Pittsburgh, Pa.; John Carmichael, Baltimore, Md.; George J. Sharkey, chief clerk supervisor of track's office N. Y. C. Lines, Kingston, N. Y.; J. T. Bowser, chief clerk maintenance of way Q. & C., Danville, Ky.; C. C. Cook, division engineer B. & O., Philadelphia, Pa.; C. Clay, A. T. & S. F., East Las Vegas, N. M.; T. W. Whitney, supervisor N. Y. S. & W., Blairstown, N. J.; Edgar W. Walsh, roadmaster C. & N. W., Ironwood, Mich.; L. Brumaghim, supervisor of track N. Y. C. & H. R., Kingston, N. Y.; A. Swartz, division engineer Erie, Huntington, Ind.; W. K. Walker, division engineer M. P., Wichita, Kan.; P. J. Keenan, supervisor Erie, Cuba, N. Y.; B. A. West, roadmaster A. T. & S. F., Pueblo, Colo.; F. E. Crabbs, roadmaster C. & N. W., Chicago; P. H. Hamilton, S. L. & S. F., Pittsburg, Kan.; S. B. Peter, roadmaster S. L. & S. F., Pittsburg, Kan.; Wm. E. Bohl, fore-

man A. T. & S. F., Belpre, Kan.; C. C. Henkel, section foreman Erie, Paterson, N. J.; P. J. M. Weslyng, roadmaster A. R. & I., Lethbridge, N. W. T., Canada; C. King, supervisor Long Island, Jamaica, N. Y.; E. W. Gulley, roadmaster C. R. I. & P., El Reno, Okla.; J. W. Foote, division engineer N. Y. S. & W., Jersey City, N. J.; E. R. Lewis, division engineer M. C., Bay City, Mich.; M. Henry, supervisor C. & E. I., Salem, Ill.; J. D. Archibald, assistant supervisor N. C., Baltimore, Md.; M. Ganley, roadmaster A. T. & S. F., Argentine, Kan.; J. F. McNally, assistant superintendent A. T. & S. F., Chanute, Kan.; James Sweeney, supervisor C. & E. I., Danville, Ill.; D. C. Baird, supervisor P. R. R., Reading, Pa.; W. W. Greenland, assistant engineer Wabash, Moberly, Mo.; P. J. McAndrews, roadmaster C. & N. W., Belle Plaine, Ia.; Arthur Jung, roadmaster A. T. & S. F., Newton, Kan.; W. H. Cleveland, roadmaster A. T. & S. F. Wellington, Kan.; E. J. McVeigh, storekeeper G. T. Ottawa, Ont.; William J. Potter, University of Pennsylvania, West Philadelphia, Pa.; B. M. Hudson, T. & B. V., Teague, Tex.; A. W. Kauffman, M. W. & S. clerk P. R. R., Oil City, Pa.; F. H. Carpenter, roadmaster A. T. & S. F., Hutchinson, Kan.; J. E. Tobin, roadmaster I. & G. N., Houston, Tex.; M. B. Whitney, San Francisco, Cal.; J. L. Taylor, assistant division engineer G. R. & I., Ft. Wayne, Ind.; E. M. Lewis, assistant engineer C. G. W., St. Charles, Ill.; James Ryan, Jr., supervisor C. & E. I., Villa Grove, Ill.; John C. Pierson, Meadville, Pa.; D. F. Harvey, supervisor P. & L. E., Beaver Falls, Pa.; Jos. J. Morgan, storekeeper N. Y. C. & H. R., Kingston, N. Y.; F. M. Patterson, assistant engineer C. B. & Q., Chicago; V. P. Drugan assistant supervisor B. & O., Philadelphia, Pa. A number of these papers appear in this issue and the others will be printed in early succeeding numbers.

WATERPROOFING.

WHILE the waterproofing of engineering structures has received great attention within recent years, and has been much discussed, it must still be regarded as largely in an experimental stage. The most rapid development of waterproofing has occurred within the last few years, and it has received its greatest impetus from the large amount of track elevation work done where it is necessary that the streets below the structures be protected from seepage of any kind from the tracks above. As is to be expected during the rapid growth of any industry, numerous products and methods of widely varying effectiveness have appeared. The discussions for the most part have centered about the relative merits of these different products. For this reason the paper by Mr. Finley, which appears in this issue, is especially valuable, as it discusses the broader problem of waterproofing, including protection against the disintegration of masonry by water as well as the prevention of the passage of water through the structure. While the usual idea of waterproofing is that of a means to prevent water from passing through a structure, Mr. Finley was first drawn into a study of this subject by the disintegration of masonry structures by water, and the first waterproofing he did was to prevent water from disintegrating stone arches. This is one application of scientific waterproofing which is frequently not considered.

The most important point emphasized in Mr. Finley's paper relates to the proper design of a structure for waterproofing. Waterproofing is but a means to an end, and the water itself must be disposed of as quickly as possible. While the general practice has been to slope the surface of the bridge from the center towards each end and to conduct the water down behind the abutment, this is in many cases not the best method. On large structures it frequently means the accumulation of a large amount of water which could be disposed of more readily by the construction of down spouts along the curb lines or at other points. By decreasing the amount of water present the burden on the waterproofing is correspondingly reduced. After designing to dispose of the water as quickly as possible, the structure should be designed for facility in application of the waterproofing. Instances are frequent where the structure has been designed without any reference to the waterproofing, with the result that unnecessary obstacles are encountered in its application and it is not given a fair opportunity to fulfill its purpose. Rather, the waterproofing should be considered as an integral part of the structure and kept in view in the entire design the same as erection details and other fixed conditions. It is gratifying to notice the increased attention paid to this matter recently.

The details of the application of waterproofing and the relative merits of the different compounds are the subject of much argument. For most railway structures a protected coating is now generally considered more desirable than a compound tending to make the concrete itself impervious, for the greatest trouble is experienced with water percolating through cracks and joints rather than with seepage through the walls and slabs themselves. While there is a wide variety of products used, it must be remembered that good results depend very largely upon proper application. This not only includes proper heating and handling of the materials, but also selection of the most favorable weather conditions possible for doing the work. Even with the use of the best products and of great care in applying them, the results are likely to be unfavorable if the work is done late in the season or during a period of stormy weather. This should not, however, reduce the incentive for using the best products, for as the cost of waterproofing bears such a small relation to the cost of a railway structure, and as water is capable of doing so much damage, it is economy to use a thoroughly reliable product.

One point of difference developed in the discussion of Mr. Finley's paper was regarding the advisability of bonding the waterproofing layer to the concrete or masonry. In some cases this has been hard to do, but by using the method outlined in his paper Mr. Finley has been able to secure a good bond. The objection to bonding waterproofing to the concrete is that any movement or settlement of the structure will cause the waterproofing to crack. If the waterproofing is not bonded to the concrete any puncture of this layer will enable the water to collect under the entire surface and seepage is very likely to result.

THE SECTION FOREMAN PROBLEM.

THE increasing difficulty of securing an adequate supply of good section foremen is giving railway managers serious concern. The need for more good foremen is not confined to one locality, but prevails all over the country. A survey of this subject shows that several conditions stand out prominently. (1) The quality of foremen and laborers has steadily deteriorated during the past decade, and is still declining. (2) The demands made on the tracks by heavier trains running at higher speeds require not only a heavier and more complicated track construction but more careful maintenance as well. (3) It is almost certain that the cost of track maintenance is increasing more rapidly than the cost of other railway operation, although it is not possible to mathematically demonstrate this.

Twenty years ago section laborers were almost universally English-speaking, and in most cases native Americans. Conditions have gradually changed, until now a large proportion of track laborers belong to inferior classes of foreign labor.

At the present rate of increase of foreign foremen it will not be many years before the native foreman will be the exception. While some foreign laborers make efficient foremen, most maintenance officers find that they often are not satisfactory, as it is more difficult to get them to understand any new development and they do not tend to remain as long as the native. Furthermore, the average foreign laborer is not capable of filling a foreman's position. A canvass of 45 assistant foremen on one main line division of a large railway system disclosed that 9 of them were Irish, 24 Italian, 7 American, 1 Welsh, 3 Polish and 1 English. Twenty-five had a common school education, 15 a poor education and 5 none. A study of 119 track walkers showed that 11 were English, 7 Irish, 6 German, 3 Polish, 1

Austrian, 90 Italians and 1 Russian. As the section foremen are generally selected from the assistant foremen and trackwalkers, some idea can be gained as to the future foremen.

This gradual change in the character of foremen is a natural result of the economic development of the country, combined with the fact that the wages paid for track work have not kept pace with those in other industries, and in other branches of railway work. The young men who now enter railway service naturally turn toward the train service or mechanical department, where the wages are much higher and have been continually increasing; the railway has been and is competing with itself to the detriment of the track department.

In spite of this decline in the quality of the track labor, the loads on the track have increased greatly and the track structure has been greatly strengthened to withstand the stresses to which it is subjected. The methods of track maintenance have likewise changed, and the foreman accustomed to the track of 20 years ago, mud ballasted and track laid with 60-lb. rails, would be at a loss to know what to do on the main line track of today. Rail anchors, tieplates, bond wires, split and movable point switches, etc., all so common today, were unknown then.

It is to be expected that under these conditions of operation and maintenance the cost of track work will increase. An increase in track maintenance cost even in proportion to the increase in traffic might even be admitted to be natural. But the deterioration in the quality of track labor has contributed largely toward increasing the cost of maintenance; and the poorer quality of foremen has had an even more decided effect. Even with poor labor comparatively good results may be secured by competent supervision.

The true seriousness of the problem presented by the scarcity of good section foremen is evidenced by the 53 contributions to the contest on this subject conducted by the *Railway Age Gazette,* and which closed on March 25. These contributions came from all parts of the United States, from New York to San Francisco and from northwestern Canada to Texas; and their authors discuss plainly the question as it confronts them on their individual divisions and give their ideas of the proper remedy to apply. Several of their papers are presented in this issue; and others will appear in later issues.

While several things can be done to improve the situation, two means seem especially to require adoption. The first is an increase in the wages of especially competent foremen sufficient to induce good men to enter and remain in the service. The second is to find some plan to attract enough capable young men into the service, and then educate them for future foremen.

A suggestion for a voluntary increase in the wages of members of any class of employees is likely to meet with opposition from many railway managers. The managers have been in recent years constantly struggling with the problem of meeting increasing transportation costs in the face of stationary or declining passenger and freight rates. It has taxed the capacity of the executives to meet the pressing demands, and the policy of deferring every increased expenditure as long as possible, even if shortsighted, is a natural one under the conditions. The fact is, nevertheless, that the wages paid section foremen have not increased as much in proportion as the wages paid to other classes of railway employees, general office clerks excepted; and probably it is this more than any thing else which has driven many of the older men into other work and prevented capable young men from entering section work. At one time the wages of the section foreman were practically equal to those of a trainman and higher than those of a telegraph operator. Today, however, the trainman receives practically double the wages of the foreman, and the operator somewhat more, in addition to having their hours of labor limited by federal and state laws. The report of the Interstate Commerce Commission for the year ending June 30, 1910, gives the following average wages per day: Enginemen, $4.55; conductors, $3.91; firemen, $2.74; machinists, $3.08; trainmen, $2.69; telegraph operators and despatchers, $2.33; station agents, $2.12, and section foremen, $1.99. This compares with the wages paid the same employees in 1892 as follows: Enginemen, $3.68; conductors, $3.07; firemen, $2.07; machinists, $2.29; trainmen, $1.89; telegraph operators and despatchers, $1.93; station agents, $1.81 and section foremen, $1.76. In other words, the increases given organized labor have been greater both absolutely and in proportion than those of unorganized labor. Much as the railways deplore many of the methods of unionism, they are in reality penalizing those who do not organize and thereby furnishing to unorganized employees the strongest argument in favor of organization. The unrest evident among track men in many quarters is a sign of future trouble unless it is arrested. The strike of maintenance forces on the Chicago terminals and on the Delaware, Lackawanna & Western last year show how the wind is blowing. The Grand Trunk Pacific also had trouble with its maintenance employees over a year ago, and an arbitration committee appointed by the Minister of Labor of Canada made material increases in the wages of men and foremen. The railways may be able now to prevent organization by adopting a scheme of wages for section foremen based on individual merit. Ordinarily horizontal increases in wages are undesirable; but the present discrepancy between the pay of track men and other employees invites disturbances and interferes with efficiency; and it would seem that the best means of meeting the situation would be to provide a wage scheme under which the pay of the more capable foremen would be increased in proportion to efficiency.

While many men believe it would be economical to pay a high enough rate to secure native labor in the gangs, this is very doubtful. Rather, it would be advisable to pay high enough wages to foremen to get men who would obtain the best results possible from the present inefficient labor. The increase in efficiency would be gradual, but once the grade of men was raised to the proper standard it would remain there. If the roads can raise the standard of men without unionism, the general efficiency can be increased, but if the standard of wages is raised as a result of unionism, past experience does not indicate that efficiency will be increased.

However, an increase in wages alone will not solve the foremen problem. Attention must also be given to the education of the future foreman. To induce young men to enter the service, provision should be made to pay a slightly higher rate than the average laborer's rate to one man in each gang, or at least in each three or four gangs, with the understanding that he is to remain in the service and be given opportunity to develop into a foreman. One criterion of a good roadmaster is his ability to build up an organization of foremen about him. With a wage of $1.75 to $2 per day, a promise of continuous employment through winter, and the prospects of securing a foreman's position at $75 to $90 per month, it should be possible to secure competent young men. By the roadmaster giving personal attention to the student foremen and seeing that they are placed under a number of capable foremen who will each give them the proper instruction, workmen will be developed from which capable foremen can be selected as needed. This plan is now in use with various modifications on several roads.

Other things suggest themselves which, although incidental to the two remedies given, are of importance. One is payment for overtime. On many roads the section foremen are subject to call at any time to patrol track during a storm or to help clear a wreck. In some cases it is the practice to do heavy track work, such as the renewal of crossings, etc., on Sunday when the traffic is light. The operating man knows just what chance he has of getting trainmen to work under these conditions without paying them, yet the section foreman is not paid for overtime.

The rapidly increasing use of motor cars and the experimental combination of maintenance forces on the Union Pacific indicate the present tendency towards a reorganization of track work. If a portion of the savings effected by these changes be applied towards an increase in the foremen's wages, this will contribute very materially towards a solution of the foreman problem, and there will still be shown a net saving.

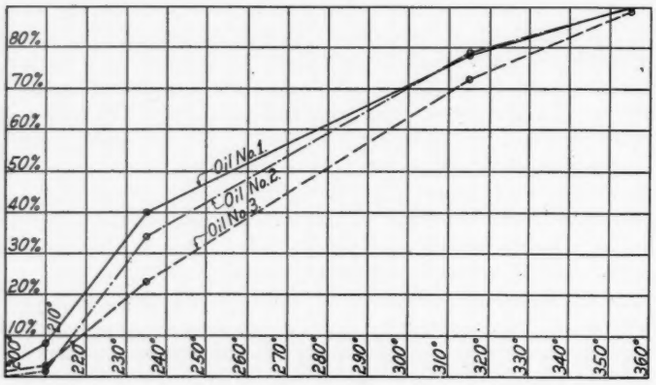
Letters to the Editor.

STANDARD CREOSOTE SPECIFICATIONS.

NEW YORK, N. Y., March 19, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In your issue of February 16, there appeared an editorial on the subject of "Creosote Oil Specifications," in which you discussed the papers presented by Dr. H. Von Schrenk and the writer at the recent meeting of the Wood Preservers' Association. In view of the interest in this matter, I submit an abstract of a communication which has been received from the writer to V. K. Hendricks, chairman of a sub-committee of the Wood Preservation Committee of the American Railway Engineering Association.



Distillation Tests of Oils.

"The argument in favor of the present specifications has been that oils containing higher percentages of oil distilling below 235 deg. were not stable in character, owing to their greater evaporative loss. It seems, of course, perfectly rational to suppose that evaporative loss in creosote should bear some definite relation to the distillation range of the oils. Believing that the elimination of oils distilling below 210 deg. would materially reduce the evaporative loss of a given creosote, we have recently been making a number of tests to demonstrate this point.

"The procedure was as follows: Three creosote oils were prepared by combining the fractions of oil obtained from one still of tar in such a way that oil No. 1 contained a rather larger percentage of the fraction distilling below 210 deg., and a moderate percentage of the naphthaline fraction (210 to 235 deg.), No. 2 contained a minimum of oil distilling below 210 deg. and exactly the same percentage of distillate between 210 deg. and 235 deg., as No. 1. No. 3 was exactly in compliance with your standard specification, viz., less than 5 per cent. below 210 deg. and less than 25 per cent. total distillate below 235 deg. These three oils were strictly comparable; all being prepared from the same tar, the character of the various fractions did not differ in composition.

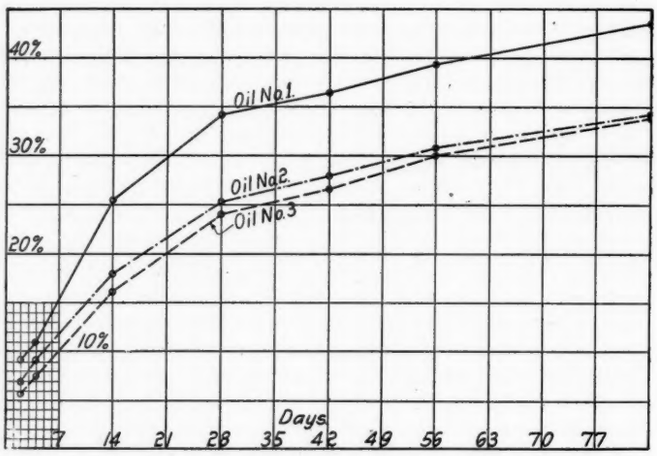
"A number of very thin pieces of wood, 3 in. sq., were treated with the three different oils by dipping in hot and cold oil. One series of blocks was poplar and another North Carolina pine. After draining, the blocks were carefully weighed on the laboratory balance and hung up on a line. In each series of tests three blocks were treated with each preservative, and untreated blocks were also weighed and hung up for controls to determine whether any unusual amount of moisture absorption took place during any period.

"One of the accompanying diagrams shows the evaporative loss from the North Carolina pine blocks. Weighings were made after 2, 4, 14, 28, 56 and 84 days' exposure. The results demonstrate very clearly that oil No. 2 with 32 per cent. of naphthaline has practically the same loss as oil No. 3 with 21 per cent naphthaline. Both of these oils contained approximately the same percentage of light oil (about 2 per cent.), whereas oil No. 1, with 32 per cent. of naphthaline and 8 per cent. of light oil has a markedly higher evaporative loss.

"The same was true, even to a more marked extent, with poplar blocks where there was hardly any penetration and the oil was practically all on the surface. Evaporation under these conditions was of course more rapid. At the end of two weeks, oil No. 1 had lost 74.4 per cent.; No. 2, 57.7 per cent., and No. 3, 56.7 per cent.

"The evaporative loss of oil in a compartively short period, particularly in the last-mentioned series of tests, seems alarmingly high, but it should be remembered that the conditions were most favorable to accelerated results. The surface exposure, compared with the amount of oil injected, was, of course, tremendous. At the same time we believe the results to be more rational than results obtained by allowing oil to evaporate from the open vessels, as in the foregoing tests evaporation took place under conditions which very closely resembling service tests, whereas in evaporation from the 'pans' surface tension may affect the results.

"While we do not claim that great importance should be attached to the results of any one series of tests, yet these results are certainly significant and are exactly in line with indications which we previously obtained under conditions less closely



Evaporative Loss of Oil from Wood.

controlled. It is our intention to have many more experiments made along these lines, and we wish that independent investigators would also have tests made to determine whether these results would be substantiated. It is needless to say if they were substantiated this would be a matter of great importance to all consumers of creosote oil, as it would render available for the highest grade of preservative work a considerably greater amount of oil distilling from coal tar than the present standard specifications will allow."

S. R. CHURCH,
Manager, Research Department, Barrett Manufacturing Company.

The proceedings of the eighth annual convention of the American Wood Preservers' Association, which was held in Chicago on January 16, 17 and 18, 1912, have just been issued. The continued steady growth of the association is indicated by the increased size of the annual volume of Proceedings from year to year. In this volume are included the papers presented before the annual convention of the American Wood Preserver's Association, abstracts of most of which have been printed in *The Railway Age Gazette,* together with the discussions, constitution, list of members, etc. A considerable amount of statistical information regarding the number of ties purchased, amount of timber treated and preservatives used, etc., is also included in the back of the book.

THE PROBLEM OF THE SECTION FOREMAN.

Contributions Received in the Prize Contest, Discussing Methods of Providing a Satisfactory and Sufficient Supply.

FIRST PRIZE—USING "STUDENT FOREMEN."

BY A. E. HANSEN,

Roadmaster, Atchison, Topeka & Santa Fe, Topeka, Kan.

At least 85 per cent. of the regular section laborers in the East and North are white, English speaking, American laborers. While they are not all of the class that possess the desired qualifications to make a first-class track foreman, I think at least 15 per cent. of these laborers could be trained to make first-class track foremen in a very short time, if proper financial inducements were offered them, and skillful and systematic teaching was provided by competent track foremen and roadmasters. But the situation on Western and Southern roads is almost the reverse, where about 85 per cent. of the section laborers are foreigners who do not intend to make this country their permanent home and consequently do not try to master the English language or American track work well enough to make first-class track foremen, except in very rare cases. I think the time is opportune for maintenance officers, especially in these sections of the country, to devise some means to strengthen their track departments.

While roadmaster on a northern road some time ago, I had permission to keep a few young men on my division at increased salary for the purpose of training and educating them for the position of section foremen, and in nearly every case they matured into successful foremen.

The title of these young men was "Student Foremen." I selected them as young as possible, near the 21-year mark, unless I found one a little older, partly matured, who possessed the required qualifications. I always made sure of a first-class physical condition, good moral character, at least a good public school education and a desire to remain in the track department for the purpose of promotion. I placed these young men with the very best section foremen on the division and instructed the foremen to thoroughly post them as to the best manner of doing track work and supervising a crew of men, and as to the general rules of the company. The foremen were made to understand that it would be a credit to them and would be much appreciated if they trained these young men to be first-class foremen. After working a while on one section I would change a student to a different section under another good foreman, giving him an opportunity to see work done in different ways, and I always gave the students as much of my personal time as I could possibly spare for instruction and encouragement. After having far enough advanced in ordinary section work so that they had a fair knowledge of the proper way of doing common repair work and properly handling an ordinary section crew, I placed them in extra gangs as assistant foremen under good, up-to-date extra gang foremen, where they had a better opportunity to learn surfacing of track out of face, general lining, relaying rail out of face, constructing new tracks, and managing a large crew of men, which is the stumbling block in the path of many of our old-time section foremen. When extra gangs were taken off at the close of the summer season I would place these young men with some good yard foremen, where they would have an opportunity to familiarize themselves with that class of work.

After going through these three ordeals, if I found them sufficiently matured to be capable of handling a section, I would call them into my office and spend a whole day with them, first going over every detail in connection with track work, questioning them as to their manner of doing the work and if I found any weak spots or flaws in their planning and execution of the work, I would advise them of better methods. I would then turn them over to the clerk in the office for a couple of hours' good schooling to get them familiar with the handling of reports of all kinds and other work pertaining to the office.

After this I would have them fill out the regular section foreman's examination book, composed of from sixty to seventy-five questions pertaining to the general rules prescribed for the section foreman. I would look over their answers and if I found any of them that showed a shade of doubt as to the correct understanding, I would set them right. After they had passed the physical examination I would declare them extra section foremen and would use them as relief foremen until I could place them as permanent section foremen.

I was always proud of these young self-made foremen; their work was modern and up to date; their daily, weekly and monthly reports were made up neatly and promptly; they led in intelligence; they were capable of protecting and properly representing the company's interests along their sections and in the community in which they lived; in fact, they stood head and shoulders above the majority of our average old-time section foremen.

I firmly believe that if every roadmaster was permitted to employ ten such young men on a 30 section division, paying them at least five cents per hour more than the other laborers and could handle them on a plan similar to the one I tried he would find his track supervision improving from year to year where foreign laborers are used exclusively. This additional supervision would pay big dividends from the very day of its inauguration. There are but two questions to be asked: First, will the management invest a little additional money? And, second, will the roadmaster and section foreman interest themselves enough in these young men to carry out their part successfully?

SECOND PRIZE—HOW TO PROVIDE A FUTURE SUPPLY OF SECTION FOREMEN.

BY GEORGE E. LOWE,

Supervisor, Delaware, Lackawanna & Western, Elmira, N. Y.

In the first place, to be a good competent foreman a man must be able to read and write the English language fairly well and be fairly well versed in the common branches of mathematics so as to be able to handle the time of the men in his charge and fill out the various forms in use. The question is ofter raised as to whether the American or foreign born is the better class to pick from. We should choose the man who can meet the requirements regardless of his nationality. I believe all roads employ enough intelligent laborers to supply good foremen. I mean young, ambitious men with enough "get up" in them to handle a gang of men, providing they can be induced to stay at the work long enough to acquire the experience necessary to make them good foremen. Under the system now in vogue on most roads this is almost impossible, because a young, intelligent man will not work with the ordinary laborers long enough to get the necessary experience. He only stays on the track as laborer until he finds other work which he thinks is more fitted for him and this is easy to find owing to the general demand for laborers who are a little above the average in intelligence.

All railway companies should offer such young men an inducement. The roadmaster or supervisor should be in a position to go to a young man and say, "John, I want to make a foreman of you. I want you to take the job of assistant foreman, then when you are capable of handling a section I'll give you a chance. Now the pay as assistant foreman will be 10 to 15 dollars a month more than you can make doing ordinary labor and you will be able to get the necessary experience required to handle a section." This will appeal to any young man who has an ambition to make a good foreman. As a rule a roadmaster or supervisor has charge of from 15 to 50 section gangs. I do not advocate an assistant foreman on every section, but there are from three to seven sections on each division which are

hard or yard sections which have from six to twelve men when reduced to winter basis. These are the sections where an assistant foreman would get the most experience and be able to do the most good for the company, providing, of course, he has been placed with a competent foreman. Not all foremen who are capable of handling a section are fit to train an assistant foreman. The foreman who is to train an assistant should be a man big enough for the job and one who will give the assistant a good square deal. There is always some one in the gang who will test the assistant's authority as soon as an opportunity presents itself, and this has been the cause of the downfall of many an assistant foreman and has nearly condemned the practice of having assistant foremen on many roads. An assistant foreman should be given authority to discipline his men and if necessary to go as far as to suspend or discharge a man and be upheld by his superior, for an assistant foreman without this authority will surely be a failure. I think under this system, if properly handled, not only will the assistant foremen earn the additional wages paid but a supply of good competent foremen for the future will be provided.

PROVIDING A DIVISION FOREMAN TO TRAIN MEN FOR SECTION FOREMEN.

BY J. J. MORGAN,
Storekeeper, New York Central, Kingston, N. Y.

The first step in training future section foremen is to secure the services of an expert trackman, who should also possess a thorough business education. Call him the division foreman, although a more appropriate title might be suggested, with headquarters at the terminal of the division on which his territory is located. It is understood from the title that my idea is to have one of these foremen on each division, unless the territory is so small that he could cover two or more divisions. Starting at the most convenient point on his division, he would visit each section, spending at least half a day with each gang, watching the men carefully, correcting their errors, and giving them pointers. His main object, however, would be to watch for good trackmen, men who understand their work and perform their duties faithfully and carefully, without shirking under difficulties. These are the men of whom he is to make the section foreman of tomorrow. This foreman, on visiting each section, would keep a record of these "live wires," watching them particularly and taking notes of their good and bad features. After he has visited each section two or three times, he would have a list of the cream of the division as regards section laborers.

The next step for the division foreman is to teach these future foremen to read and write, supplying them with the necessary stationery, etc., and issuing instructions. He should endeavor to secure the co-operation of the section foremen in assisting the men in this respect. By keeping in touch with the men, the division foremen can ascertain when they are ready for the next step, furnishing them with reading matter that would tend to better their education. After they have mastered reading and have acquired a good legible handwriting, and the division foreman feels that they are competent to understand what they read, each man should be instructed and drilled on the book of rules until he is able to answer any question that may come up. There is no limit to the amount of study required on these rules, which, if followed carefully, would do away with a great many complaints.

The last step, although by no means least in importance, is to instruct the men in making out all the reports that the section foreman has occasion to use. They should be instructed on these reports until they are able to make out each report fully and sensibly. They should be furnished with a copy of each report properly made out, in order that they may study them in detail, and then make out others, altering the circumstances, and forward them to the division foreman, who would make any corrections necessary. This matter of knowing how to make out reports correctly is a very important one, which if properly inculcated in the minds of the men at the start, would save a great deal of trouble and extra correspondence. It is often necessary to return reports two or three times and sometimes a personal interview is necessary before the desired information can be procured, thereby causing delay. This is sometimes true with foremen who have been in the service for years on account of the fact that they received the wrong impression in the beginning.

As an inducement to keep the men interested. I should consider it a good idea to offer two or three prizes annually of $5 each to the laborers who contribute the best ideas on track improvements and maintenance.

There are men working in section gangs today who would make the kind of section foremen so much in demand if someone would only take an interest in them and teach them to read and write the English language. Why let these "live wires" pass unnoticed, when for a comparatively meager cost they could be instructed and would make section foremen of the highest type.

THE NECESSITY FOR INCREASED WAGES.

BY JAMES SWEENEY,
Supervisor, Chicago & Eastern Illinois, Danville, Ill.

In looking for foremen for the future we naturally investigate the ever diminishing supply of good foremen we now have. In the early days of railroading there was a steady migration of young men from Ireland who were tired of fighting against adverse conditions at home. When they landed in this country there were very few fields open to them except as laborers on public work and this class of work was more plentiful on the railways than anywhere else. Changing conditions have combined with the increased demand upon the section foreman to prevent the Irish laborer from entering railway work on the section. Better conditions at home have retarded emigration, shorter hours and higher pay in the building trades have offered inducements that have practically stopped such laborers from going on the section and advancing to foremanship.

As a result the railways have employed Americans wherever possible for foremen but the American who would make a good foreman has a desire to work for himself or to get into a field where advancement is faster and he no sooner sees an opportunity to get into the train or engine service than he leaves the section. Not finding a sufficient number of Americans for foremen the railways have hired foreigners, taking first the Norwegians, Swedes and other Northern European peoples and later the Italians and Greeks, and are still promoting them to foremen with varying success. All of these people are handicapped in that they cannot speak our language when they come here and after they do learn to speak the language it is a much longer time until they can be depended upon to read with understanding. It must not be lost sight of that for a man to be a success as a section foreman he must have as much education as a trainman, not only to interpret the instructions given him as to his work, but to satisfy the federal government through the Interstate Commerce Commission by giving to the railway management correct data on a multitude of happenings which only the foreman can supply.

The solution of the whole question is in the wages paid both to the laborers and the foremen. Twenty years ago we paid less wages than we are paying today, but the wages paid bought more then than they do today. As proof of this, some section laborers at that time owned their own homes, while today very few foremen and practically no laborers are property owners. Work is not as steady now as it was in the past owing to construction work having practically stopped. The country is so well equipped with railways that the great majority of construction work will be on short connecting lines that will give no great amount of work to the section men in dull times. Other fields of work have opened along the line of every railway in the small industries that are steady bidders for common labor and are pay-

ing as much or more for labor than the railways. Since these industries are growing concerns, they are giving steadier work than the railways. Farm products have increased in price to such an extent that the farmer can and does pay better wages than the railways and the laborer on the section has been attracted to the farm. The above conditions have made it impossible to get the best class of men for section laborers and without the laborers we have no way of securing material for foremen.

I have tried paying more for the most competent man in the gang when recommended by the foreman in the hope of holding good men for foremen and I regret to say that out of nine main line sections where the experiment was tried there were but five men recommended for the increase and one of the five was an Italian. On two of my yard sections I have been able in the past four years to educate two young men from timekeepers and they are making excellent foremen, yet in this time I can recall as many as ten who were in the same position and left either to take better positions or were discharged for incompetency.

Every railway through its roadmasters is trying to find foremen and there are as many methods as there are roadmasters. In my mind, however, the supply of foremen will equal the demand only when we admit that the section foreman is worthy of the wages he has earned but never received. When the foreman receives more than a brakeman there will be no inducement for a track man to leave the track and when the laborer is paid more than laborers in the vicinity we will have men who will crowd the incompetent section foreman off the road.

ECONOMY OF INCREASED WAGES.

BY J. E. TOBIN,
Roadmaster, International & Great Northern, Houston, Tex.

To provide a future supply of good track foremen it will be necessary to increase the present rate of wages. Able-bodied, intelligent, English-speaking white men are the proper men for section foremen on American railways. It is necessary for a track foreman to work as a laborer for some time before being placed in charge of a section. The present rate of wages for section laborers is no encouragement to able-bodied, intelligent young men to work as laborers on track, so it will be necessary to increase the wages of the laborers as well as the foremen.

It is customary now on a great many railways to specify a certain amount of money on each roadmaster's division to pay the wages of laborers, foremen and others connected with the maintenance of track. Let each roadmaster select one first-class track foreman at say $125 per month, and place him in charge of an extra gang of 12 to 25 men paid at a rate of wages on a sliding scale, three-fourths of the gang at $2 per day, one-eighth at $2.25 and one-eighth at $2.50; the men to fill out the regular form of application, which should specify qualifications required with a view to making those men foremen. Of course, it would be understood that the oldest man in the service would be promoted as vacancies occur, others advanced along the line in the gang and a new man hired at the low rate. This gang could be known as the "school gang" and moved to different points along the line, making all kinds of track repairs. This gang would accomplish 100 per cent. more work in a given time than is done by an equal number of the present section forces, besides doing a better class of work. Increase the section foremen's wages to $100 per month and one laborer on each section to $2.50 per day, the balance of the section gang to remain at the present rate. Of course, it would be necessary to reduce the force to avoid an increase in the pay roll. This would stimulate both the laborers and foremen and result in a better class of men, as well as better track. Rough track damages the rolling stock and creates expense for labor and material in the machine and car shops.

Get good intelligent white track foremen, abolish the positions of traveling, commercial and soliciting freight and passenger agents, stock claim agents, their offices and clerks, and let the track foremen, who knows every man, woman and child in the territory through which his section runs, handle that end of the business. He knows of freight shipments to be made as well as the people liable to ride in passenger cars; knows the value of dead stock as well as the circumstances surrounding the killing or injury, and can in most cases adjust the matter with owners without going off the right of way or interfering with his duties as section foreman. His influence in the town and neighborhood will be increased by the increase in his wages, and he can control business for the railway that perhaps the traveling agent would not find.

SOLVING THE PROBLEM BY ATTRACTING AMERICAN BOYS.

BY C. C. HENKEL,
Section Foreman, Erie, Paterson, N. J.

With the advent of the foreign track laborer the problem of securing competent foremen is becoming more and more difficult. The Italian, Hungarian, or other south of Europe track laborer who will make a good foreman is the exception rather than the rule. The lack of knowledge of the English language is against him; he doesn't thoroughly comprehend our method of doing things, and is usually of a timid disposition and so afraid of losing his job as to prevent his using very much originality in doing his work. I think it is generally conceded that native Americans should be employed as track foremen, the foreign laborer being used only as a last resort.

How are we to attract American boys to track work? A large railway system in the West has adopted a plan of employing students of technical schools as trackmen during their summer vacations. After graduation these men return to the railway as section foremen. This is a very philanthropic act on the part of the railway company, as the supply of technical graduates every year greatly exceeds the demand. Unfortunately the average college man is of little or no use on a railway.

One cannot learn from books how to become a successful track foreman, but must work in the gang, tamp ties, help with the tongs, drive spikes, tighten up bolts, etc. From this it is evident that any scheme for securing men and training them to become successful track foremen depends almost entirely on the foreman in charge of them. The supervisor is the man best able to judge which of his foremen are most capable to train the men. The foreman's interest in the matter must first be aroused. I would suggest that his prejudices could best be overcome by paying him a small extra compensation each month for each student foreman in his charge, or by payment of a lump sum when the man under his care is promoted to be a foreman.

Almost every section foreman knows of two or three young fellows in his neighborhood who have a common school, or better yet, a high school education and who would make good timber for track foremen. He should have no difficulty in pointing out to them that to become a machinist they would have to serve as an apprentice for four years at about $1 a day, while it is possible to get $1.50 a day as a track laborer and become a section foreman in one year's time at a monthly salary as good as if not better than that received by the machinist, to say nothing of the greater fascination of the work, the larger authority, greater freedom, and better health secured from working out of doors. It would seem best to put two or three young fellows in the same gang in order that they may have a little social intercourse. This gives them an opportunity to exchange ideas and to talk over the work they are doing. If the foreman takes a real interest in the boys, and if they make the most of their opportunities there is no reason why any ambitious young man should not be able to take charge of a section on a branch line in a year's time. The supervisor can greatly aid the work of the foreman in educating the young men by showing that he is interested in their progress.

Another thing which is going to aid greatly in securing com-

petent men for foremen is the introduction of labor saving machinery, such as section motor cars in track work. In this connection, I might also mention the recent movement to include all the branches of maintenance work under the section foremen, that is, the signal work, both mechanical and electrical, wire repairs, and light carpenter jobs, such as putting in a pane of glass, etc. I have actually seen the track foreman and his men, the mechanical maintainer and his helper, a gang of wire men and the electrical retainer and his batteryman, all start out to work in single file with two hand cars and two speeders.

There is no reason why the section foreman, if furnished with a good assistant, could not look after interlocking, signals and batteries, and wire repairs, in addition to his track work. The improvement in organization and efficiency gained thereby would make it possible to materially increase the wages of section foremen so that they would compare favorably with those of men engaged in the train service and the question of where to secure a supply of competent track foremen would be a thing of the past.

REORGANIZATION TO SOLVE THE PROBLEM.

BY C. CLAY,
Atchison, Topeka & Santa Fe, East Las Vegas, N. M.

Educating foreign labor will not solve the problem of securing good section foremen. The one thing to do is to reorganize to a certain extent, and then use American labor. Pay a higher wage to laborers; give them a chance for promotion, and promote according to ability as shown by examination. Each gang should include one or more Americans who are desirous of promotion. Wages should not be less than $1.75 per day. A saving of seven-tenths of the men required can be made in this way owing to the men being more efficient. There would also be a decrease in the cost of material and tools owing to the greater efficiency of the men, but this amount could only be determined by actual test.

Equip each section with a motor car and extend its length to 10 miles but not to exceed 12. Increase the foremen's wages to $75 per month or higher, according to locality. Doubling the length of sections would release 50 per cent. of the present foremen, allowing the roadmaster to pick the best and place the others as laborers with preference over laborers then in service as to date of examination for promotion. They would, if they desired promotion, feel this displacement and work all the harder and possibly surpass some of the foremen who had been retained. No man should be promoted unless he can read, speak and write the English language. The cost of motor cars will be more than offset by the decrease of time taken to get from place to place.

Extra gang foremen should be paid not less than $90 per month or higher, according to locality, and they should be required to pass a more extended and harder examination than section foremen and should be promoted from section foremen. Assistant extra gang foremen should take the same grade as section foremen. The offset to this increased expenditure would be higher efficiency. The roadmaster's clerk should be promoted from an extra gang foreman. The experience in the office will give him an idea of the executive part of a roadmaster's work, and you will then have a competent man to take a roadmaster's position at any time that one is needed. There should be a general roadmaster who would have sole charge of the track department in his jurisdiction and report direct to the general superintendent. This would save the division superintendent a great deal of work and would mean a greater effectiveness in the distribution of material and labor. There would be scarcely any increase in expenditure by the appointment of a general roadmaster, as the increased expense of himself and staff would be offset by the number of maintenance clerks that would be released from division offices. While some of the changes would take time to effect, a general roadmaster who is competent and not afraid to work could reorganize his department and have it working on a sound basis under this plan with plenty of men working for promotion within a year.

A GRADUATED SCALE FOR SECTIONMEN.

BY E. W. GULLEY,
Roadmaster, Chicago, Rock Island & Pacific, El Reno, Okla.

It is my opinion that a graduated or sliding scale of wages will solve the section foremen problem. Since 12½ cents per hour is a common standard of pay for section labor, I will take that as a standard. After a laborer has worked a given length of time, say six months, increase his pay to 14 cents per hour, then after another period of six months, increase his pay to 15 cents per hour. As he has then been in the service one year, the foreman and roadmaster should be able to judge whether or not he would be desirable material for a foreman, and, if so, his wages should be increased to 16½ cents per hour, with the understanding that he must "get into the harness" with a view of making a foreman out of himself. After another period he may be used as a relief foreman on various sections. This will develop to the entire satisfaction of the roadmaster whether or not he is a man of the right material for a permanent foreman, and if he is not, then he must stand for his own weakness and be set back to the 15-cent rate. It is to be understood that not all section labor will receive the benefit of these raises, but where a laborer sticks for six months, he is entitled to the first raise of 14 cents, and if he remains on the same section for the second period, he is entitled to the second raise, namely, 15 cents per hour, but unless he is considered as available material for a foreman, he will not receive the third raise.

CLASSES FOR TRAINING EMERGENCY FOREMEN.

BY D. C. BAIRD,
Supervisor, Pennsylvania Railroad, Reading, Pa.

Our superintendent instituted a method a few years ago by which a supply of trained and competent section foremen is provided. Each foreman is asked to recommend a man, or men, from his gang whom he thinks may in time by proper training make a foreman. The men whose names are thus submitted by the foremen are closely observed by the supervisor, if he is not already well acquainted with them, and those who are thought to be capable of development are formed into a class which at frequent intervals is called together and instructed by the supervisor in the time table, book of rules, standard maintenance of way material and its economical use, methods of doing track work, the making out of rolls, monthly and other reports, the handling of men for efficiency and their own personal safety; in short, everything pertaining to the duties of a section foreman. Throughout the period of instruction the men of the class are taken from their own gangs whenever work which is out of the ordinary routine is being done on other sections and are put on such work where they are closely looked after and instructed by the foreman in charge. In this way the men are brought into close actual contact with much work which must be done quickly, accurately and safely and they gradually develop the ability and confidence which make them competent foremen. After some months of instruction under the supervisor and participation in the installing of turnouts and crossovers, laying rail, cutting into service new tracks, heavy lining or raising under traffic, etc., the class when deemed ready for the supervisor is turned over to the division engineer for a final rigid examination preparatory to the making of appointments. The men who pass the best examinations, a certain standing being required, are given the title of "Emergency Foremen," and are available for duty as foremen whenever required. Ordinarily, these men work as laborers in their respective gangs, but whenever a regular foreman is off duty one of these emergency foremen takes his place.

We have made foremen by this method with perfect success and have today three emergency foremen under each supervisor ready to take sections of their own. In any considerable number of men, whether American, Italian, Hungarian or other nationality, there will always be found a few capable of becoming leaders. If the foreman question is ignored until a vacancy exists there will be trouble in filling it, but if the pick of the track men be trained the answer to the foreman question will be found.

ORGANIZING A ROADMASTER'S DIVISION TO TRAIN FOREMEN AND ROADMASTERS.

BY M. B. WHITNEY,
Student in Railway Operation, Southern Pacific, San Francisco, Cal.

In this discussion it is assumed that the problem is to increase the number and improve the quality of the American-born track foreman, as the foreign-born foreman is at the best only a makeshift. We now obtain our American-born foremen from other railways or from other districts of our own road. The best foremen, who are satisfied and efficient, hold their positions. Those traveling around looking for new work are as a rule inferior men who have been in track work many years, have their own set way of doing everything, and listen to the instruction of the roadmaster with the secret intention of following them as little as possible. The roadmasters, in busy seasons especially, being eager for anything that looks like a foreman, hire these applicants only to find their real worth in a few months. Then the foreman leaves, moves along to a new position, and the process is repeated. Even this floating class of white foremen is becoming depleted, for each year they grow older, and few men new foremen are made. The only exception to this class of foremen are those who come from eastern railways attracted by the higher salaries paid in the West, and those who move from one road to another in search of better climatic conditions. As a rule these men are efficient.

The responsiblity for the foreman situation does not lie with the roadmasters. They would be very willing to train up young men if they only had some to train. Unfortunately the present daily wage paid to track laborers is insufficient to tempt a capable young American to perform manual labor for a year or two in a gang of foreigners, in the hope of getting a section in the end. A man should, however, undergo an apprenticeship as laborer before he can qualify for the position of foreman. We cannot provide for the training of young American-born foremen without the authorization of an expenditure of more than the minimum sum required to do the regular track work. This money must be paid in the form of higher returns to the white laborers.

Each roadmaster might have a fixed number of apprentice foremen continually under him, at a fixed monthly salary, prescribing whatever training he thinks best. The apprenticeship should last from one to two years according to the ability of the man and the immediate need for new foremen. It would be unnecessary for these apprentices to spend their entire time as laborers, and when the need arose they could be of considerable value as assistant foremen of extra gangs and as substitute section foremen. A supplementary value of these apprentices would be that the knowledge that they were "coming along" would spur the regular foremen to better efforts.

The second problem is to hold the men after they are obtained and trained. One improvement over present practices would be to make a few gradations in the desirability of the different sections on each roadmaster's district. A brakeman can bid in a more or less desirable run according to the length of time he has been in train service. On some runs the work is easy, but the returns are low; while on others the work is more difficult but the returns are higher in proportion. Similarly station agents and operators are not paid uniform salaries, their salaries varying according to the size of the station and the value of the position. On most railways, however, each road section pays the same return, and also each yard section. When a section foreman after long service becomes old enough to be given preference in the choice of a section, having no chance for a higher salary, he chooses a section on which the work is light or one which is near a school for his children; yet these experienced foremen are the very men needed on the difficult sections, not the light ones.

Would it not be well to have two or three different grades of section, each grade paying a different salary, and to fill the higher grades with the older foremen, assuming that they are equally as efficient as the best younger foremen. The lowest grade would be sections on branches or main line sections where traffic is light; the second, main line sections in localities not commonly subject to emergencies; and the third, such as washouts and slides.

The next step would be to reorganize the yard section at the roadmasters' headquarters. Make this the most desirable section, giving the foreman the additional title of assistant roadmaster, with authority to handle material on the roadmaster's district, and to take charge of routine correspondence and emergencies in the absence of the roadmaster. Under the assistant roadmaster let there be an assistant foreman in charge of the yard gang, this assistant foreman to receive less salary than any other section foreman, his position being a stepping stone between apprentice and foreman. The combination yard foreman and assistant roadmaster would be in a class by himself. He would have more salary and more authority than any other foreman, in fact, his function would be much like that of the assistant roadmaster discussed in one of D. A. D.'s letters. The cost of him and his assistant foreman would be but little more than the combined cost of a yard section foreman and a roadmaster's clerk, but the value received would be greater. The assistant roadmaster would be a potential roadmaster in case the roadmaster was wanted for a higher office, and his presence at headquarters would enable the roadmaster to spend more time where he belongs, supervising the work.

DEVELOPING FOREMEN.

BY P. H. HAMILTON,
St. Louis & San Francisco, Pittsburg, Kan.

There is plenty of available material for section foremen if it is developed. The old-time foreman or roadmatser will possibly say, "No one ever helped me. I got all of my experience from hard knocks." That is true; but he will not deny that if he had received assistance he would have developed much faster. The average roadmaster never looks for a foreman until he needs him; and then he is hard to find.

The roadmaster should know what kind of men he needs and should develop them after that type. An efficient roadmaster will insist on efficient foremen; and efficient foremen will insist on having efficient men—provided they are allowed to pay sufficient wages. Efficient men can be easily developed into efficient foremen. To get good men the foreman should be allowed to pay wages that will compare favorably with common labor. This would allow him to get men with experience, ability, ingenuity and ambition. These men could be relied upon and they would not be of a transient disposition, as their jobs would mean something to them. There would be competition and each man would put forth his best efforts. The foreman should be allowed to keep a number of such men continuously employed. Then the roadmaster would be able to develop a sufficient number of foremen.

To produce efficiency in any department it is necessary for the men to become interested in the work. It is impossible to interest a man in his work when he is making barely enough to live on. He holds a grudge against his employer for treating him so shamefully. He does not care to excel in his work and he only aims to do as much as his neighbor, and his neighbor only tries to keep pace with the poorest man in the gang. He has no fear of being discharged, for he can get plenty of jobs as good as or better than the one that he has. The result is that in some places we get the poorest class of men for track work; men who are morally, mentally and physically incompetent.

In this locality the foremen are much more efficient than they were years ago. We have a bunch of strong, upright Americans who are not addicted to drink, and who are interested in their work. The hilarious, rollicking "Larry" is no where to be seen. Our foremen are all intelligent, have common educations, and several are excellent penmen. The efficient foreman should not only be able to keep his track in shape with a limited allowance, but should be able to make comprehensive reports. In

times past I have known of foremen who had to keep men in their gangs to read the "butterflies" that the roadmaster would throw off of trains. In my opinion our foremen are more efficient than at any previous time, and I believe that they could continue to be so.

Good men can be kept on the sections as long as they have steady work, even though the rate of pay is slightly less than that paid for common labor. But when gangs are being cut down to the minimum one month and then increased to a large number the next month, and then cut down again in a few weeks, it demoralizes the force for the entire division. Good men soon get discouraged with this and look elsewhere for steady employment. The roadmaster should be allowed to maintain a uniform number of men, cutting forces during the winter months and increasing to a reasonable number in the spring. It should not be necessary for him to hire an extraordinarily large number of men during the hottest month and then reduce to the minimum the next month, thus discouraging the new men.

Another thing that discourages good men is to have the roadmaster bring in new foremen from the outside without first canvassing the division for a trackman suitable to be made foreman. The roadmaster should show all of his men that he has confidence in them. When a foreman asks for a few days "lay off" the roadmaster should first ascertain if there is a man working for that foreman who could handle the section for a few days. If there is not he can probably send a good man from some other section. These little tryouts give the roadmaster an idea as to the various candidates for foremanship, and it gives the candidate a chance to get some good experience. When a new foreman is needed the roadmaster can pick his man.

We have recently issued instructions, and the foremen understand that if they have a man who is ambitious to become a foreman, and they think him capable, they should have the man assist with the reports and should instruct him along that line. In this way there is no confusion in the clerical work when a new man takes charge of a section. This does not insure the man a job, but makes his chances for a foremanship much better. Any man who is ambitious to become a foreman is willing to put in a few moments in the evening occasionally with the foreman if there is a chance of advancement.

While it is impracticable for any one roadmaster to inaugurate an education system among the men, I believe that he should encourage the men to self help. We have a number of foremen and laborers who are now enrolled with the International Correspondence Schools, and without exception these are the best. On roads where the company has no educational bureau the roadmaster should encourage the men to take courses with correspondence schools. Any man who will put in an hour's time each evening at study after a hard day's work is bound to make a good man.

There are thousands of young men today, some of whom are high school graduates, working in stores and driving delivery wagons, who are receiving less wages than the average trackman. One of these young men in each gang would be developed into a good foreman. In hiring men the foreman and roadmaster should not only take into consideration what he can do now, but should consider whether or not he can be developed.

INCREASED PAY FOR FOREMEN AND ROADMASTERS.

BY F. E. CRABBS,

Roadmaster, Chicago & North Western, Chicago.

The causes of the lack of supply of section foremen are: First, the pay is no inducement for laborers. Second, the pay for foremen is not a sufficient enucouragement. Third, without capable young men growing up in this kind of work the supply of first-class foremen and roadmasters is getting shorter each year.

The first remedy for more and better men is to materially increase the pay of the present foremen and roadmasters. Regular section foremen should receive $65 per month and yard section foremen $75 per month. All foremen should be paid for actual hours of overtime put in at night doing such work as cannot be done during the day or emergency work which is done on Sunday. Each foremen should get one week's vacation each year with pay. Each superintendent should be permitted to employ five substitute foremen under the different roadmasters on his division at a salary of $50 per month. On regular sections where the section foreman has charge of the coal sheds he should be paid $5 per month extra for looking after these sheds. Roadmasters should be promoted according to their ability as an encouragement to the younger men who are entering the service.

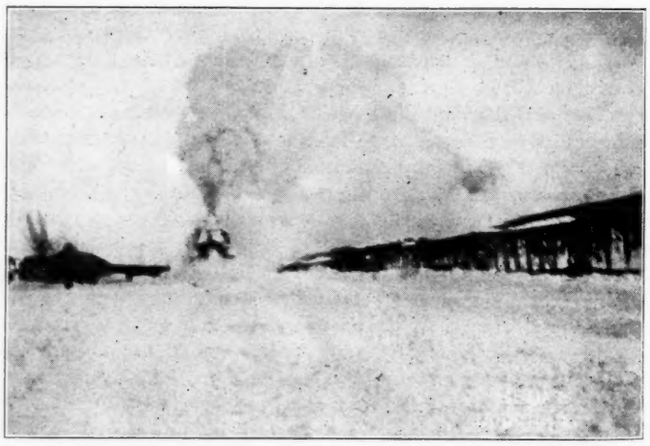
The roadmasters and foremen have sons growing up who are naturally track men and should fill the larger part of these places, but today some roads will not permit a son to work with the father and therefore the son seeks other employment so that he may remain at home and be brought up properly.

FIGHTING SNOW IN KANSAS.

BY L. C. LAWTON,

Division Engineer, Atchison, Topeka & Santa Fe, Newton, Kan.

The snow storms of the winter of 1911-'12 will long be remembered in Kansas for their unusual circumstances; not only by the railways, but also by the people living there or caught entrain. The record for depth of snow and height of drifts in the first storm was not only a new one for the state, but the second entirely outclassed it and a third late in March holds all records for depth. On December 20 from 12 to 20 in. of snow fell throughout the western part of the state. No wind accompanied it, and sunny days with cold nights made a heavy crust. By all precedent this would have been safe from the railway standpoint, but on the last day of the month a severe blizzard came which lasted ten days. Not much snow fell, but the wind managed to get under the crust of snow, often around weed stocks, filling every depression and leaving huge drifts in the lee of every wind break. It was not content to blow up snow alone, but a great deal of sand was blown into many cuts. This was accompanied by some sunshine and very cold nights with a temperature of 20 deg. below zero, which congealed the drifts into masses of ice and sand.

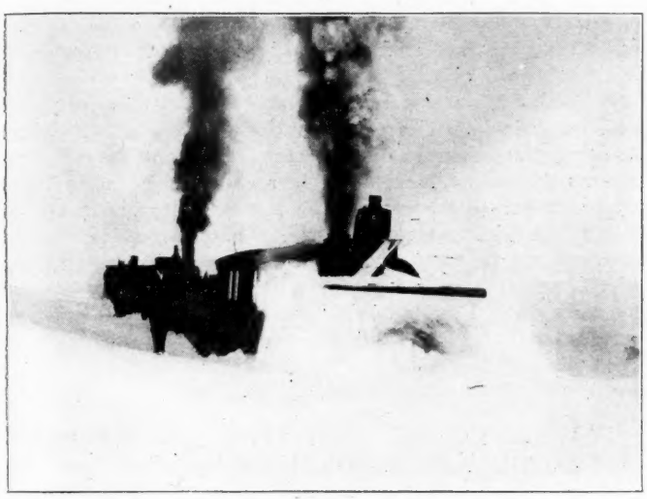


Engine With V Plow Working in Dodge City Yard.

Not since 1886 has traffic on our road been seriously interfered with by snow, and in fact, since that time, very little use had been found for rotary plows or snow fences. Several of the former were held in the terminals for such emergencies, but it was necessary to train a new set of enginemen to handle them. The snow fences had disappeared, and on right of way lines had been replaced with wire. The younger officials and a majority of train and trackmen had never

been up against such a proposition. The rotaries were not entirely successful, as the ice broke many blades as well as several eccentrics and shafts, and at best they could only take care of the main line, leaving several hundred miles of branch lines for the old "V" or wedge plow, built up on the front of an engine.

Little that was new was developed in the use of the rotaries, except in the speedy repair of broken parts. Two heavy engines were used and a work train with a large extra gang kept near it to help through the heavier cuts. A closer organization was kept on the branch lines, as they were farther from headquarters and relief of any kind. A unit there consisted of three engines, to one of which was fastened the



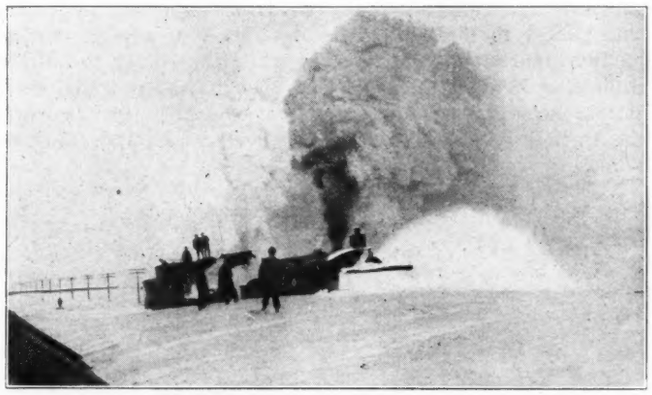
Rotary Snow Plow on Great Bend Branch.

plow, two gangs of 30 or 40 men each, bunk, kitchen and dining cars, extra train and engine crews and often the business car of the official in charge, who was usually superintendent or even the general superintendent. Work was pushed night and day when possible, with 10 or 12-hour shifts, but the superintendent was frequently not out of his working clothes for four or five days at a stretch. Twenty cents per hour and board were given laborers on the Santa Fe, and no trouble was met in getting good men.

Experience proved that it was safer and surer to use but two engines in bucking drifts, especially on branch lines with light rail. When these would fail to get through a drift the

Opening Branch Line Cut by Shovelling Onto Cars.

third, which was following with the work train, would pull out the other two and after the rail was flanged they would go at it again. If the snow was unusually deep or icy, the extra gang would cut trenches 3 to 5 ft. wide, and 9 to 12 ft. apart, at right angles to the track which made the breaking through much easier. It was not unusual to find drifts extending out from the windward side of the cut in such a manner that there would be 10 ft. of snow on one rail, while the other was swept clear. These had to be dug down or they would throw engines from the track, by turning them over or by breaking



Rotary Working East of Wright, Kan., February 26.

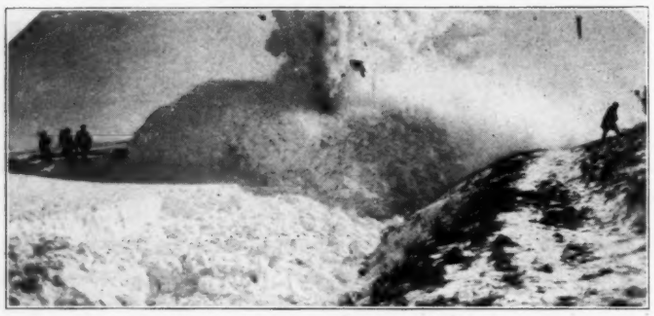
the rail, if not by derailing the engines. The engines were handled by special signals from one man, so that no time was lost at any point. Another detail which had to be watched very carefully was the flanging of the rail before a second run was made into the drift. The weight on the wheels compressed the snow on the inside of the rail into a mass of ice as high or higher than the rail, and this caused almost certain derailment if taken at high speed.

The second storm began on the morning of February 25, changing from a very wet snow to a fine, dry one as the day got colder, and the wind increased to an unusual velocity, even for Kansas. The storm was much heavier and covered a larger territory than the first, and at noon of the first day

Branch Line Cut Opened by Shovelling Onto Cars or Over Bank. The Last Snow Thrown Out Required Five Lifts.

all trains stopped running. At the end of 24 hours, there was from one to two feet over almost the entire state, but everywhere piled into immense drifts, dwarfing those of the first storm. This snow was exceedingly heavy and damp, packing into cuts in such a way that it was hard to move with any kind of a plow. Methods were employed similar to those used in the first snow, except in a few places where drifts up to 20 ft. deep were encountered in rather narrow cuts. There was nothing to do but shovel these out, and two methods were used. By making several lifts much of it was shoveled out of the top of the cut, and at the same time a train of coal

cars was run into the face of the drifts and filled by a relay of shovelers working from the end car. As soon as the drift was opened a section gang was left with it, to remove all snow from the center of track and for a foot or so beyond the end of each tie. There was little thawing weather during the next three weeks, and we had three or four light snows accompanied by heavy winds which would fill these cuts almost to their first height. This kept several outfits on the branches all the time, as while the rotary had little trouble in keeping the main line open it was not advisable to take it away from there. The removing of all snow from the track in cuts proved of value here, as it made the re-

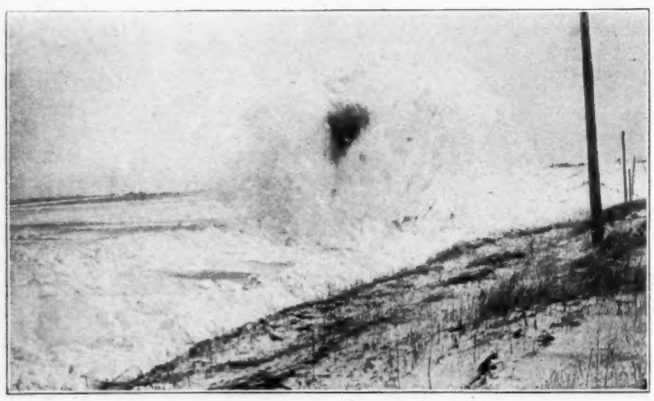


Rotary Passing Through Side Drift Which Had Been Cut Down to Prevent Derailing Engine.

opening much easier. Its greatest value has been felt, however, since the snow has been melting, as it has left the center of the track dry while the ditches have been full of water. At the date that this article is written, after all except the very heaviest drifts have melted, all track, where well ditched, is in very good condition for earth or screening ballast.

The third snow which reached a depth of 26 in. in places, fell on March 23. There was some wind and considerable delay to trains, but no tie-up occurred, and it has metled quickly.

The Santa Fe had hoped with the opening of the Belen cut-off to be able to keep one road to the coast open at all times. However, these heavy snows extended into Northern Texas and tied up the line there for the larger part of two



Rotary Starting Through a Cut.

days. After this the through trains were sent by that route until Western Kansas was open. A number of trains were blocked in small towns where the passengers were fed at the best hotels or at private houses, but where possible they were held at points having railway hotels. Agents were instructed to entertain all passengers as well as possible, and many novel entertainments were gotten up. In many places the town people joined in showing the travelers a good time, as they were themselves "shut-ins."

The railways were caught unawares by this extreme winter, but the outlying towns and ranches were in even worse conditions for such a siege. On account of a dry year, it was known that some stock food would be shipped in, but with an open winter the amount would have been small. The getting of this in after the snow had covered all forage was the most serious question, but later a shortage of fuel and even provisions was felt in many places. As tracks were opened trains of provisions and coal were given precedence over all others. Of course, the business of the majority of the branch lines at this time of the year did not justify even a small part of the expense taken in opening them, had there not been this imperative need which was almost a life and death matter. In many places the people turned out and helped open the tracks, and in other ways showed their appreciation. At the end of one branch they took possession of a train and with the help of the engine crew, opened the entire branch line before it could be reached from the main line.

At another town a merchant got together a large party and with no train help cleared a number of miles of bad drifts. In other places agents did the same thing, and several conductors opened up long pieces of road with one engine and a large bunch of laborers, running only under protection of flag, as the wires were not yet up. These men were all paid the regular rate, whether engaged by employees or not. For several years there has been a good deal of enmity against the railways in Kansas but it is hoped that this will bring us nearer together. If so, this winter may not be a losing deal after all.

NEW SANTA FE MAINTENANCE OF WAY DEPARTMENT RULE BOOK.

The Atchison, Topeka & Santa Fe has just published a book of rules for the guidance of employees in the maintenance of way department, in which a number of features have been included which are not usually covered in such books. The duties of the various officers of the maintenance of way organization, including the roadmasters, section foremen, bridge and building foremen, division engineers and signal supervisors have been fully covered, and a number of sketches are included, showing the right and wrong ways to do different pieces of work. The organization of the maintenance department showing to whom each officer reports, is shown clearly in a sketch.

One feature of interest in this book is the instructions for the treatment of persons injured until the arrival of medical aid, covering two pages. Another new section is that in which instructions are given for the proper care and operation of hand, motor and push cars. A number of rules are here given, observance of which will largely eliminate the common accidents occurring from collisions or men falling from such cars. The usual set of standards for roadbed and turnout is given at the back of the book.

On March 14 Panama canal steam shovel No. 124, a 70-ton Bucyrus shovel, loaded 290 small Western dump cars containing a total of 2,900 cu. yds. of material in the working day of eight hours. In this period the shovel was delayed one hour and 50 minutes waiting for cars. This is the highest daily output for a 70-ton shovel since commencement of the work on the Isthmus of Panama by the United States.

The Canadian Railway Commission has issued a fire guard regulation governing all railways in the provinces of Alberta and Saskatchewan, which provides that on or before August 1 of each year the railways must construct along each side of the right of way, and not less than 300 ft. distant from the center, a fire guard consisting of a plowed strip of land not less than 16 ft. in width. This fire guard must be kept free from dry gases, weeds and other combustible material, between August 1 and December 1.

WATERPROOFING ENGINEERING STRUCTURES.

Abstract of a Paper Before the Western Society of Engineers, March 18, 1912, Describing Successful Methods of Protection.

BY W. H. FINLEY,
Assistant Chief Engineer, Chicago & North-Western.

My attention was first directed to the necessity for some method of waterproofing engineering structures by the number of limestone masonry arches that were slowly but surely deteriorating, due to the infiltration of water. Investigation disclosed that very little had been attempted along this line, and no definite information could be obtained regarding methods or materials. The waterproofing of a masonry arch presents no very difficult features, and my earlier attempts in this direction met with a fair degree of success. However, since the extensive introduction of the elimination of grade crossings in cities by the elevation of the railways, the problem of waterproofing has been greatly complicated by the necessity for making the subway bridges water tight.

This has caused very rapid development in both methods and materials for waterproofing, until now you can get all sorts of information as to how it should be done and what materials to employ, and yet the problem is far from being satisfactorily solved. Engineers have received some very rude shocks in this line of work, causing them, at times, to doubt whether it was possible to do a satisfactory job of waterproofing. The rapid expansion in this field has brought into existence the waterproofing "expert," who takes his place along with the paint expert, who has for years periodically offered us a paint that would at last prevent the corrosion of metal structures; and yet the corrosion of metal structures still goes on.

While listening to the rival claims of advocates of different methods of waterproofing, the engineer must not lose sight of the fact that waterproofing, at best, is but an expedient, and will not take the place of proper designing, or correct poor construction. Water is a universal dissolvent, and if not gotten rid of in time will seep through the ordinary materials of construction. The first requisite in the designing of any structure that must be water tight is to provide means of getting rid of the water as directly and quickly as possible. In the numerous track elevation bridges around Chicago, whatever the type of construction, the usual practice has been to slope the floor from the center to each end, carrying the water away back of the abutments, and right here is where much trouble has developed. Although one may place broken stone filling and tile drains back of the abutments, when the surface ice and snow melts in the springtime and the filling back of the abutments is still in a frozen condition, the water does not escape freely, but piles up and eventually seeps through at the end of the bridge and flows over the face of the abutment. In bridges having supports on curb lines and in the middle of the street, whether of flat slab construction or metal troughs filled with concrete, cracks are likely to appear where joints are not provided for over these supports, and where joints are provided for, trouble is likely to be experienced in preventing the seepage of water.

I will now take up, in a general way, the different methods and materials in use, and will first mention what is called the integral method. This method consists in adding a paste, powder, or lixivating water to the concrete, mixing it with the cement, the mass of concrete as a whole or with the water. While there is no doubt that any of these methods will make concrete impervious to water, as indeed can be done with ordinary concrete by careful proportioning and selection of aggregates, with subsequent care in placing, yet we know that monolithic concrete is apt to develop cracks from a variety of causes, and when that occurs you are likely to have seepage of water through the mass. For that reason I have always preferred for waterproofing engineering structures what has come to be called the membrane method.

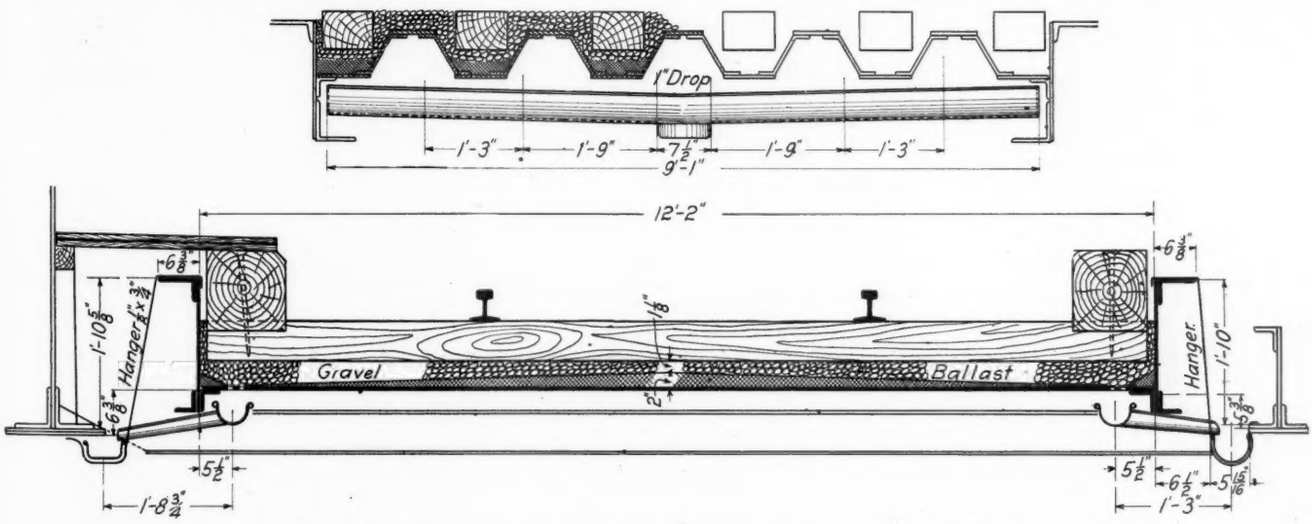


Fig. 1—Section of Bridge Over Main Street, Rockford, Ill., Built in 1893.

When I first took up the question of a suitable material for waterproofing engineering structures, I investigated the respective merits of asphalt and coal tar pitch. The only instance of the use of the latter with which I was familiar had not proved very satisfactory, and I decided to use asphalt. At that time there were few, if any, artificial asphalts on the market, and I necessarily used a natural asphalt. The structures then waterproofed are still in good condition. Since that time there has been an extensive development of artificial asphalts from petroleum oils. In nearly all cases it is claimed that the artificial asphalts offered for waterproofing purposes have a Gilsonite base. Gilsonite is described by G. H. Eldridge in his article on "The Asphalt and Bituminous Rock Deposit of the United States," as "a black, tarry-looking substance of most brilliant luster, normally of absolutely homogeneous texture and

exceedingly brittle." It is found in the Minta basin, Utah, and takes its trade name from S. H. Gilson, an early prospector. It occurs in vertical veins in enclosing sandstone, and the veins vary from a knife edge to 30 in. in thickness. It is generally conceded that the origin of Gilsonite and other hydrocarbons may be traced to petroleum. Inasmuch as the sandstone in which Gilsonite occurs contains no trace of petroleum, it is evident that it was forced up from a great depth by an enormous pressure. Gilsonite is a very pure form of hydrocarbon, and is used in a variety of ways in the arts and trades. It is used in varnishes and baking Japans, insulating materials in electrical work, and for making mineral rubber, as well as in the artificial asphalts. Taking the amount of waterproofing asphalts that are turned out every year I was interested in learning the total production of Gilsonite. I found from a reliable source that the total production last year was in the neighborhood of 30,000 tons, and the previous year somewhat less. I am afraid that the Gilsonite base of our artificial waterproofing asphalt is a very thin one. Petroleum oil is not a uniform product, varying very much at different places, and for that reason I have always been fearful that in asphalts made from petroleum oil we would not get a uniform product. However, I have had tested a number of artificial asphalts and found them to fill the following specifications very easily.

Material.—1. (a) Asphalt shall be used which is of the best grade, free from coal tar or any of its products, and which will not volatilize more than ½ of 1 per cent. under a temperature of 325 deg. F. for seven hours. (b) It must not be affected by a 20 per cent. solution of ammonia, a 25 per cent. solution of sulphuric acid, and a 35 per cent. solution of muriatic acid, nor by a saturated solution of sodium chloride. It should show no hydrolytic decomposition when subject, for a period of ten hours, to hourly immersions in water with alternate rapid drying by warm air currents.

Range of Temperature.—2. (a) For metallic structures, exposed to the direct rays of the sun, the asphalt must not flow under 212 deg. F., nor become brittle at 0 deg. F. when spread thin on glass. (b) For structures underground, such as masonry arches, abutments, retaining walls, foundation walls of buildings, subways, etc., a flow point of 185 deg. F., and a brittle point of 0 deg. F. will be required. (c) A mastic made from either grade of asphalt by mixing it with sand in the proportion of one of asphalt to four of sand, must not perceptibly indent, when at a temperature of 130 deg. F. under a load of 20 lbs. per sq. in. It must also remain pliable at a temperature of 0 deg. F.

In asphalting a metal surface it is imperative that the metal be cleaned of all rust, loose scale and dirt, and if previously coated with oil this must be burned off with benzine or by other suitable means. The metal surface must be warm to enable the asphalt to adhere to it, and the warming is best accomplished by covering it with heated sand, which should be swept back as the hot asphalt is applied. When waterproofing concrete structures it is very necessary that the surface be thoroughly brushed with wire brushes to remove all loose particles and get rid, as far as possible, of what the French call "laitance." It should then be coated with a liquid asphalt primer, and I believe that better results will be obtained if, just ahead of the application of this primer coat, the surface is swabbed with gasolene.

I am not an advocate of felts or burlaps for ordinary waterproofing. I believe that an ordinary concrete surface, whether in a slab bridge or an arch, needs nothing but an application of a primer coat of asphalt and then a coat of liquid asphalt, after which a hot sand mastic, composed of one part of asphalt to four of sand, can be applied with hot smoothing irons. On top of this it has been my practice to put on a swabbing coat of hot asphalt and then to cover the whole surface with washed gravel, particularly where rock ballast was to be used. Over joints and ends of bridges it may be necessary to use burlaps for the added strength they give the asphalt in taking care of any slight movement. However, in cases of expansion joints, where any defined amount of movement is to take place, I believe that special means, such as copper flash joints, should be used. Burlap is a vegetable fiber and if used should be thoroughly saturated in a bath of hot asphalt of such temperature that it will not char or destroy the fiber. To apply asphalt to raw burlap in the field I think is wrong. If the asphalt is hot enough to penetrate the fiber it is likely to be so hot that it will char or destroy it, and if the asphalt is not hot enough one gets only a surface coat.

I would like to repeat what I have previously said about the necessity for so designing your structure that the water can be disposed of as directly as possible. If more care were taken in designing, elaborate or expensive forms of waterproofing would be unnecessary.

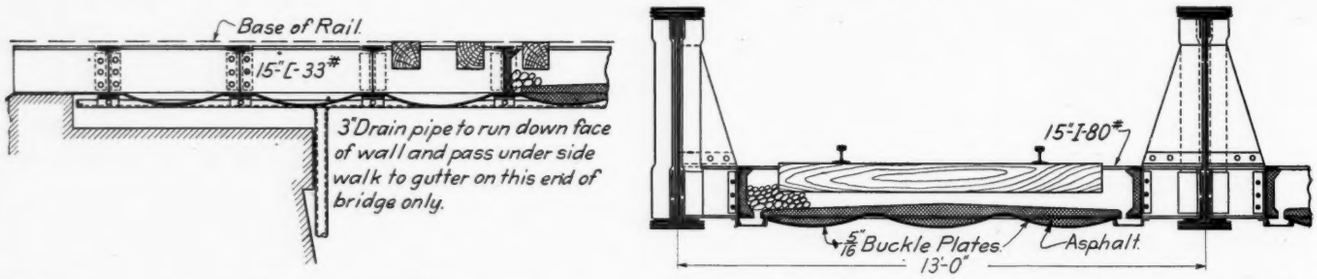

Base of Rail
15"I-33#
3" Drain pipe to run down face of wall and pass under side walk to gutter on this end of bridge only.
15"I-80#
5/16" Buckle Plates
Asphalt
13'-0"

Fig. 2—Shallow Ballasted Floor Bridge in Highland Park, Ill., Where Water is Carried Down Face of Abutment by Troughs and Downspouts.

Asphalt has no affinity for water, and all surfaces that are to be coated with asphalt should be as dry and clean as possible.

The methods I have used in preparing the asphalts are as follows:

The asphalt should be heated in a suitable kettle to a temperature not exceeding 450 deg. F. If this is exceeded it may result in "pitching" the asphalt. Before the "pitching" point is reached the vapor from the kettle is of a bluish tinge which changes to a yellowish tinge after the danger point is passed. If this occurs the material should be tempered by the addition of fresh asphalt. The asphalt has been cooked sufficiently when a piece of wood can be put in and withdrawn without the asphalt clinging to it. Care should always be taken not to prolong the heat to such an extent as to pitch the asphalt. Should it become necessary to hold the kettle for any length of time, bank or draw the fire, and introduce into the kettle a quantity of fresh asphalt to reduce the temperature.

There is a wide difference between the requirements for damp proofing waterproofing to take care of ordinary rainy weather and waterproofing where it is necessary to take care of the hydrostatic pressure of a head of water. In the latter case felt, and burlap mat properly reinforced with concrete, will be necessary.

One of the early applications of waterproofing was made on a stone arch bridge over Turtle creek near Shopiere, Wis., on the Chicago North Western. This bridge consists of five 50-ft.

arches, and was built in 1869 of Joliet and local limestones. The seepage of water through the ring and parapet walls reached such a stage that it seriously threatened the life of the structure. In 1887 this arch was uncovered, and the top thoroughly waterproofed with California asphalt. Three years ago I removed the filling and took up some of this natural asphalt, finding it in first-class condition. The waterproofing of this arch at this time prevented any further leakage, and unquestionably prolonged the life of the structure. I have waterproofed a number of old stone arches that were showing signs of disintegration due to the lack of drainage. In 1896 a couple of 30 ft. arches over streets in the town of Janesville, Wis., were in such condition that it was a question whether they should be rebuilt or not. These arches had been built in 1864 of limestone with lime mortar. Inasmuch as the double tracking of this portion of the road some time in the near future was completed, it was desirable to carry these arches as long as possible. They were uncovered and thoroughly waterproofed with asphalt. This prevented any further deterioration from the seepage of water, and in 1906, over ten years after the waterproofing was applied, these arches were replaced by double track concrete arches. The asphalt was found to be in excellent condition and a part of it was used in waterproofing the new arches.

Figure 1 is a view of a three-track bridge over Main street, Rockford, Ill. This bridge was built in 1893, and waterproofed with California natural asphalt. During the 18 years it has been in place there has been no complaint regarding the dripping of water or leakage from the bridge, although it is over the principal street in Rockford. I attribute this largely to the fact that the water is drained from each floor trough into drainage troughs and carried by pipes through the abutment and outside of the dump. This is one instance of getting rid of water as directly and as quickly as possible. It avoids the trouble that is usually experienced at the end of the bridge where the drainage is carried from the center to each end. The only

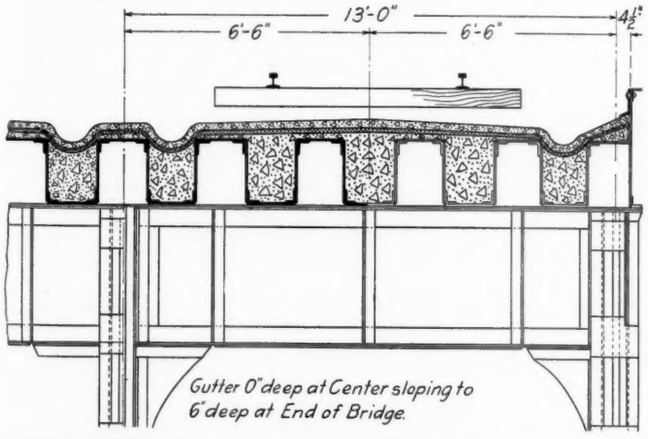


Fig. 3—Section of Subway Over Kinzie Street, Chicago.

trouble experienced with these troughs is from birds building their nests in the same during extended dry spells. These troughs have been renewed once since they were first installed. In later work troughs for a similar purpose were made of a much heavier material. The locomotive stands on this bridge while discharging and taking on passengers at the Rockford station, and I have seen locomotives with their waste water cocks open pouring large quantities of water on this floor, which was carried off directly and quickly without any trouble.

Figure 2 shows a very shallow ballasted floor bridge over Vine avenue, Highland Park, Ill. It was necessary to provide a water tight floor at this point, and this type of floor was adopted. It has troughs, and instead of carrying any of the water back of the abutments it is actually carried down in front of the abutment through troughs and down spouts. These troughs can be so arranged that it would be impossible for any trouble to occur from birds building their nests and stopping the troughs. This bridge was built in 1902.

Figure 3 is a view of a subway on what is called the Kinzie street track elevation, Chicago. You will note in this case the water is carried from the center of the subway to each end. A somewhat different method than I usually employ was used in waterproofing this bridge. The asphalt is imported mastic fluxed with Trinidad and Bermuda, and the asphalt mastic is covered by a layer of reinforced concrete. This work was done in 1905, and has proved very satisfactory, with the exception that there is some seepage of water at the ends of the bridge over the abutments. The method employed in sealing for the

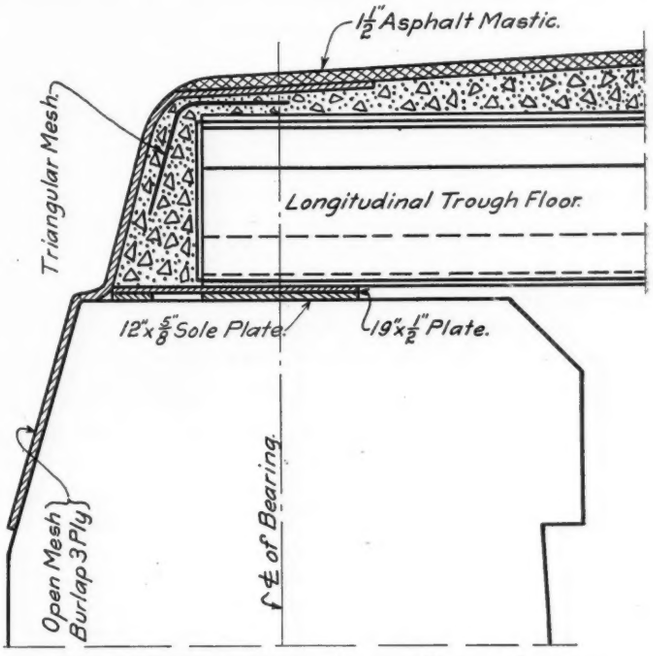


Fig. 4—Proposed Treatment of the Ends of Subways.

end, as shown in this view, did not seem to be completely satisfactory.

Figure 4 shows a proposed treatment of the ends of city subways to prevent the possibility of water getting through and flowing down the face of the abutment. This is an attempt to seal it off completely by the use of a burlap mat instead of the usual bent plate method that we have previously used.

The bridge over Wauwautosa avenue in the town of West Allis, Wis., is similar in construction to the Vine avenue structure. Last fall it was necessary to remove this bridge to make way for improvements at that point, and I was very much gratified to see how thoroughly the iron had been protected by the asphalt mastic. A bridge of this type with such a shallow floor is subject to more or less vibration and deflection that would, under ordinary conditions, make it very difficult to waterproof. However, in this case, when the bridge was taken apart and the asphalt removed there was no indication of any rust or seepage of water through or under the asphalt.

The production of rails during 1911 is reported by the American Iron & Steel Association as 2,822,790 tons, comparing with 3,636,031 tons in 1910, and the record tonnage of 3,977,887 tons in 1906. The United States Steel Corporation rolled 55.5 per cent. of the total production, representing a slight decrease in the proportion as compared with previous years. Rail exports amounted to 420,874 tons, the largest on record. The production of Bessemer rails amounted to 1,138,633 tons and of open hearth 1,676,926, this being the first year in which the total production of open hearth rails has exceeded that of Bessemer.

A. R. E. A. COMMITTEE ASSIGNMENTS.

Full Lists, with Names of Members Appointed and Subjects Given for Investigation and Report During Ensuing Year.

The new committees selected by the board of direction of the American Railway Engineering Association, together with the subjects assigned to the various committees for study, are as follows:

COMMITTEE I.

Roadway.

1. Present formulae of general application for determining waterway areas under varying conditions, including consideration of hydraulic features.

2. Report on and recommend unit pressures allowable on roadbeds of different materials, conferring with Committee on Ballast.

3. Report on tunnel construction and ventilation.

4. Economics in roadway labor.

W. M. Dawley (Erie), chairman; J. A. Spielmann (B. & O.), vice-chairman; J. R. W. Ambrose (Grand Trunk); John C. Beye (C. R. I. & P.); Ward Crosby (C. C. & O.); W. C. Curd (M. P.); Paul Didier (B. & O.); R. C. Falconer (Erie); S. B. Fisher (M. K. & T.); Frank Merritt (G. C. & S. F.); C. S. Millard (C. C. C. & St. L.); W. D. Pence (University of Wisconsin); A. C. Prime (P. R.); H. J. Slifer (C. G. W.); John G. Sullivan (C. P. R.); F. L. Wheaton (D. L. & W.); J. E. Willougby (Carribbean Construction Co.); W. P. Wiltsee (N. & W.).

COMMITTEE II.

Ballast.

1. Continue investigations on gravel ballast and recommend methods for grading the different qualities.

2. Report on proper depth of ballast of various kinds to insure uniform distribution of loads on roadway, conferring with Committee on Roadway.

3. Continue the study of physical tests of stone for ballast.

H. E. Hale (M. P.), chairman; J. M. Meade (A. T. & S. F.), vice-chairman; W. J. Bergen (N. Y. C, & St. L.); A. F. Blaess (I. C.); T. C. Burpee (Intercolonial); L. W. Baldwin (I. C.); O. H. Crittenden (I. & G. N.); F. T. Darrow (C. B. & Q.); J. M. Egan (I. C.); T. W. Fatherson (C. R. I. & P.); H. L. Gordon (B. & O.); G. H. Harris (M. C.); C. C. Hill (M. C.); S. A. Jordan (B. & O.); William McNab (G. T.); A. S. More (C. C. C. & St. L.); J. V. Neubert (N. Y. C. & H. R.); S. B. Rice (R. F. & P.); E. V. Smith (B. & O.); F. J. Stimson (G. R. & I.); S. N. Williams (Cornell College).

COMMITTEE III.

Ties.

1. Report on the effect of design of tie-plates and track spikes on durability of ties.

2. Continue study of the stresses to which crossties are subjected, and determine size required.

3. Report on economy in labor and material effected through use of treated ties compared with untreated ties.

4. Continue the compilation of information as to the use of metal, composite and concrete ties.

L. A. Downs (I. C.), chairman; G. W. Merrell (N. & W.), vice-chairman; H. W. Brown (Penn. Lines); W. J. Burton (M. P.); L. C. Hartley (C. & E. I.); E. D. Jackson (B. & O.); F. G. Jonah (St. L. & S. F.); H. C. Landon (Watauga R. R.); F. R. Layng (B. & L. E.); E. R. Lewis (M. C.); R. J. Parker (A. T. & S. F.); L. M. Perkins (N. P.); J. G. Shillinger (Rutland); G. D. Swingly (B. & O.); D. W. Thrower (I. C.); H. S. Wilgus (P. S. & N.); E. C. Young (N. Y. P. & N).

COMMITTEE IV.

Rail.

1. Present recommendations on standard rail sections.

2. Continue investigation of rail failures and present conclusions drawn therefrom.

3. Continue special investigation of rails.

W. C. Cushing (Penn. Lines); chairman; R. Montfort (L. & N.), vice-chairman; E. B. Ashby (L. V.); J. A. Atwood (P. & L. E.); A. S. Baldwin (I. C.); J. B. Berry (C. R. I. & P.); M. L. Byers (D. & H.); Chas. S. Churchill (N. & W.); F. A. Delano (Wabash); Dr. P. H. Dudley (N. Y. C. Lines); C. H. Ewing (A. C. R.); L. C. Fritch (C. G. W.); C. W. Huntington (C. R. of N. J.); John D. Isaacs (Harriman Lines); Thos. H. Johnson (P. C. & Y.); Howard G. Kelley (G. T.); C. A. Morse (A. T. & S. F.); George W. Kittredge (N. Y. C. & H. R.); J. T. Richards (P. R. R.); J. P. Snow (consulting engineer); A. W. Thompson (B. & O.); Robert Trimble (P. L. W.); M. H. Wickhorst (engineer of tests).

COMMITTEE V.

Track.

1. Present general specifications for track bolts, nutlocks, tie-plates, common and screw track spikes.

2. Continue study of design of main line turnouts.

3. Economics in track labor.

J. B. Jenkins (B. & O.), chairman; G. J. Ray (D. L. & W.), vice-chairman; Geo. H. Bremner (C. B. & Q.); A. Bruner (N. & W.); Garrett Davis (C. R. I. & P.); Raffe Emerson (D. L. & W.); E. G. Ericson (P. L. W.); J. M. R. Fairbairn (C. P. R.); T. H. Hickey (M. C.); E. T. Howson (*Railway Age Gazette*); J. R. Leighty (M. P.); Thomas Maney (L. & N.); Curtiss Millard (C. G. W.); P. C. Newbegin (B. & A.); R. M. Pearce (P. & L. E.); H. T. Porter (B. & L. E.); W. G. Raymond (Iowa State College); S. S. Roberts (I. C.); L. S. Rose (C. C. C. & St. L.); H. R. Safford (G. T.); C. H. Stein (C. R. R. of N. J.); F. S. Stevens (P. & R.); A. H. Stone (K. C. T.); W. J. Towne (C. & N. W.); C. C. Wentworth (N. & W.).

COMMITTEE VI.

Buildings.

1. Present principles covering the design of inbound and outbound freight houses.

2. Report on recommended methods of heating, lighting and sanitary provisions for medium-sized stations.

3. Complete report on roof coverings.

4. Report on the advantages and disadvantages of various types of freight house floor construction.

Maurice Coburn (Vandalia), chairman; M. A. Long (B. & O.), vice-chairman; G. W. Andrews (B. & O.); J. P. Canty (B. & M.); O. P. Chamberlain (C. & I. W.); D. R. Collin (N. Y. C. & H. R.); C. G. Delo (C. G. W.); W. T. Dorrance (Maine Cen.); C. H. Fake (M. R. & B. T.); C. F. W. Felt (A. T. & S. F.); W. H. Finley (C. & N. W.); G. H. Gilbert (Q. & C.); A. T. Hawk (C. R. I. & P.); E. N. Layfield; H. A. Loyd (Erie); L. G. Morphy (B. & A.); C. W. Richey (P. R. R.); W. S. Thompson (P. R. R.).

COMMITTEE VII.

Wooden Bridges and Trestles.

1. Report on formulae for use in determining the strength of sheet pilling.

2. Report on fire protection of wooden bridges and trestles.

3. Complete report on the use of guard rails for wooden bridges and trestles.

H. Rettinghouse (C. & N. W.), chairman; I. L. Simmons

(C. R. I. & P.), vice-chairman; H. Austill, Jr. (M. & O.); F. H. Bainbridge (C. & N. W.); F. E. Bissell (A. C. & Y.); W. S. Bouton (B. & O.); R. D. Coombs (consulting engineer); E. A. Frink (S. A. L.); E. A. Hadley (M. P.); Hans Ibsen (M. C.); Henry S. Jacoby (Cornell University); P. B. Motley (C. P. R.); W. F. Steffens (B. & A.); H. B. Stuart (G. T.).

COMMITTEE VIII.

Masonry.

1. Report on waterproofing of masonry and bridge floors, including methods, cost and results, with definite recommendations.

2. Report on the effect of concrete structures of rusting of the reinforcing material.

3. Report on the principles of design of plain and reinforced concrete retaining walls, abutments and trestles.

G. H. Tinker (N. Y. C. & St. L.), chairman; F. L. Thompson (I. C.), vice-chairman; Robert Armour (G. T.); G. J. Bell (A. T. & S. F.); C. W. Boynton (Universal Portland Cement Co.); T. L. Condron (consulting engineer); J. K. Conner (L. E. & W.); L. D. Crear (Erie); L. N. Edwards (G. T.); A. H. Griffith (B. & O.); G. W. Hegel (C. J.); L. J. Hotchkiss (C. B. & Q.); Richard L. Humphrey (consulting engineer); W. H. Petersen (C. R. I. & P.); Philip Petri (B. & O.); J. H. Prior (C. M. & St. L.); F. E. Schall (L. V.); G. H. Scribner, Jr. (contracting engineer); A. N. Talbot (University of Illinois); Job Tuthill (C. H. & D.); J. J. Yates (C. R. of N. J.).

COMMITTEE IX.

Signs, Fences and Crossings.

1. Report on the relative advantages of the different kinds of fence posts, with definite recommendations.

2. Report on the best form of track construction and flangeways at paved street crossings and in paved streets, with definite recommendations.

3. Continue the investigation of ways and means for securing a proper quality of fence wire to resist corrosion and secure durability.

C. H. Stein (C. R. of N. J.), chairman; G. E. Boyd (D. L. & W.), vice-chairman; R. B. Abbott (P. & R.); H. E. Billman (M. P.); E. T. Brown (B. & O.); J. T. Frame (C. G. W.); C. M. James (A. C. L.); L. C. Lawton (A. T. & S. F.); G. L. Moore (L. V.); J. B. Myers (B. & O.); F. M. Patterson (C. B. & Q.); C. H. Splitstone (Erie); W. F. Strouse (B. & O.); W. D. Williams (C. N.).

COMMITTEE X.

Signals and Interlocking.

1. Continue investigation of outline description of a comprehensive and uniform signal system, suitable for general adoption, conferring with proper committee of the American Railway Association.

2. Report on the effect of treated and metal ties on track circuits.

3. Economics in labor of signal maintenance.

A. H. Rudd (P. R. R.), chairman; L. R. Clausen (C. M. & St. P.), vice-chairman; Azel Ames; C. C. Anthony (P. R. R.); H. Baker (C. N. O. & T. P.); H. S. Balliet (G. C. T.); W. B. Causey (C. G. W.); C. A. Christofferson (N. P.); C. E. Denney (L. S. & M. S.); W. J. Eck (Southern); W. H. Elliott (N. Y. C. & H. R.); G. E. Ellis (K. C. T.); W. J. Harahan (Erie); M. H. Hovey; A. S. Ingalls (L. S. & M. S.); J. C. Mock (D. R. T.); F. P. Patenall (B. & O.); J. A. Peabody (C. & N. W.); W. B. Scott (U. P.); A. G. Shaver (C. R. I. & P.); Thos. S. Stevens (A. T. & S. F.); H. H. Temple (B. & O.); Edwin F. Wendt (P. & L. E.); J. C. Young (U. P.).

COMMITTEE XI.

Records and Accounts.

1. Make a comprehensive study of the forms in the manual which were adopted a number of years ago and bring forms up to date.

2. Continue study of the economical management of store supplies.

3. Recommend feasible and useful subdivisions of I. C. C. classification account No. 6, with a view of securing uniformity of labor costs.

H. J. Pfeifer (T. R. A. of St. Louis), chairman; M. C. Byers (St. L. & S. F.), vice-chairman; J. M. Brown (C. R. I. & P.); W. A. Christian (C. G. W.); Walter Dennis (C. R. I. & P.); F. B. Freeman (B. & A.); G. J. Graves (A. T. & S. F.); Edward Gray (Southern); E. E. Hanna (M. P.); G. D. Hill (L. & N.); Henry Lehn (N. Y. C. & H. R.); J. H. Milburn (B. & O.); Orlando K. Morgan (C. C. & O.); C. W. Pifer (I. C.); Frank Ringer (M. K. & T.); Guy Scott (P. L. W.).

COMMITTEE XII.

Rules and Organization.

1. Continue the compilation of rules for the government of maintenance of way employees.

2. Formulate rules in the nature of specifications or instructions regarding the conduct of work, making use of the recommendations of the various committees dealing with these subjects, and of the best practice of railway companies as embodied in their books of rules.

J. O. Osgood (C. R. of N. J.), chairman; G. D. Brooke (B. & O.), vice-chairman; F. D. Anthony (D. & H.); S. M. Braden (C. & N. W.); J. B. Carothers, (B. & O.); S. E. Coombs (N. Y. C. & H. R.); J. B. Dickson (Erie); C. Dougherty (C. N. O. & T. P.); W. T. Eaton (St. L. S. W.); J. A. Gordon (C. G. W.); K. Hanger (C. R. I. & G.); B. Herman (Southern); Jos. Mullen (C. C. C. & St. L.); F. L. Nicholson (N. & S.); W. C. Smith (N. P.).

COMMITTEE XIII.

Water Service.

1. Report on the design and relative economy of track pans from an operating standpoint.

2. Report on design of water stations, using deep wells as a source of supply.

3. Report on recent developments in pumping machinery.

Robert Ferriday (C. C. C. & St. L.), chairman; J. L. Campbell (E. P. & S. W.), vice-chairman; H. M. Church (B. & O.); C. C. Cook (B. & O.); G. M. Davidson (C. & N. W.); A. F. Dorley (M. P.); J. H. Gibboney (N. & W.); E. G. Lane (B. & O.); Curtiss Millard (C. G. W.); A. Mordecai (consulting engineer); W. A. Parker (St. J. & G. I.); Chas. E. Thomas (I. C.).

COMMITTEE XIV.

Yards and Terminals.

1. Report on typical situation plans of passenger stations of both through and stub types, with critical analyses of working capacity, and include a review of the different methods of estimating their capacity.

2. Report on developments in the handling of freight by mechanical means.

3. Report on developments in the design and operation of hump yards.

C. H. Spencer (Washington Terminal), chairman; E. B. Temple (P. R. R.), vice-chairman; W. G. Arn (I. C.); Hadley Baldwin (C. C. C. & St. L.); W. C. Barrett (B. & O.); C. H. Burgess (D. & H.); A. E. Clift (I. C.); H. T. Douglas, Jr., (W. & L. E.); A. C. Everham (K. C. T.); Geo. P. Johnson (N. & W.); D. B. Johnston (P. L. W.); H. A. Lane (B. & O.); L. J. McIntyre (N. P.); B. H. Mann (M. P.); A. Montzheimer (E. J. & E.); W. L. Seddon (S. A. L.); E. E. R. Tratman (*Engineering News*); M. K. Trumbull (C. & W. I.); W. L. Webb (C. M. & St. P.); J. G. Wishart (C. R. I. & P).

COMMITTEE XV.

Iron and Steel Structures.

1. Report on rules for instruction and guidance of inspectors in mill, shop and field.

2. Report on the methods of protection of iron and steel structures against corrosion.

3. Study the design of built-up columns, co-operating with other investigators and committees of other societies.

A. J. Himes (N. Y. C. & St. L.), chairman; O. E. Selby (C. C. C. & St. L.), vice-chairman; J. A. Bohland (G. N.); A. W. Buel (W. M.); Chas. Chandler (C. G. W.); C. L. Crandall (Cornell University); J. E. Crawford (N. & W.); J. E. Greiner (B. & O.); W. H. Moore (N. Y. N. H. & H.); Albert Reichmann (American Bridge Company); A. F. Robinson (A. T. & S. F.); C. C. Schneider (consulting engineer); C. E. Tebbetts (K. C. T.); L. F. Van Hagan (Wisconsin Railway Commission); F. O. Dufour (University of Illinois); C. E. Smith (M. P.); I. F. Stern (consulting engineer); F. E. Turneaure (University of Wisconsin).

COMMITTEE XVI.

Economics of Railway Location.

1. Continue the consideration of all questions connected with railway location, alinement, grades and improvement of grades and lines, affecting the economic operation with relation to traffic, tonnage ratings, speed, density of traffic and financial considerations, with the special aim in view of establishing uniform methods and unit values for investigating and comparing different routes and making improvements in alinement and grade.

A. K. Shurleff (C. R. I. & P.), chairman; R. N. Begien (B. & O.), vice-chairman; F. H. Alfred (P. M.); A. C. Dennis (contracting engineer); C. P. Howard (I. C.); F. W. Green (L. & A.); Fred Lavis (consulting engineer); F. W. Smith (C. C. C. & St. L.); H. J. Simmons (E. P. & S. W.); Walter Loring Webb (consulting engineer); M. A. Zook (C. G. W.).

COMMITTEE XVII.

Wood Preservation.

1. Continue investigation of proper grouping of different timbers for antiseptic treatment.

2. Investigate the merits of various preservatives, giving special attention to oil from water-gas tar, and to the use of refined coal-tar in creosote oil.

Earl Stimson (B. & O.), chairman; E. H. Bowser (I. C.), vice-chairman; G. M. Davidson (C. & N. W.); H. B. Dick (B. & O. S. W.); C. F. Ford (C. R. I. & P.); Dr. W. K. Hatt (Purdue University); V. K. Hendricks (St. L. & S. F.); C. E. Knickerbocker (contracting engineer); George E. Rex (A. T. & S. F.); E. A. Sterling (consulting forester); C. M. Taylor (C. R. of N. J.); Dr. Hermann Von Schrenk (C. R. I. & P.); T. G. Townsend (Southern).

COMMITTEE XVIII.

Electricity.

1. Continue the consideration of the subject of clearances.

2. Report on the effect of electrolytic action on metallic structures and the best means of preventing it.

3. Continue the preparation of a standard specification for overhead transmission line crossings.

George W. Kittredge (N. Y. C. & H. R.), chairman; J. B. Austin, Jr., (Long Island), vice-chairman; D. J. Brumley (I. C.); R. D. Coombs (consulting engineer); A. O. Cunningham (Wabash); L. C. Fritch (C. G. W.); George Gibbs (P. T. & T.); G. A. Harwood (N. Y. C. & H. R.); E. B. Katte (N. Y. C. & H. R.); C. E. Lindsay (N. Y. C. & H. R.); W. S. Murray (N. Y. N. H. & H.); Frank Rhea (commercial engineer); J. R. Savage (Long Island); Martin Schreiber (Public Service Railway); W. I. Trench (B. & O.); H. U. Wallace (consulting engineer).

COMMITTEE XIX.

Conservation of Natural Resources.

1. Continue the study of tree planting and general reforestation.

2. Continue the study of coal and fuel oil resources.

3. Continue the study of iron and steel resources.

E. O. Faulkner (A. T. & S. F.), chairman; William McNab (G. T.), vice-chairman; R. H. Aishton (C. & N. W.); Moses Burpee (B. & A.); F. F. Busteed (C. P.); A. W. Carpenter (N. Y. C. & H.); Howard Elliott (N. P.); C. H. Fisk (C. S.); W. A. McGonagle (D. M. & N.); G. A. Mountain (Canadian Railway Commission); W. L. Park (I. C.); G. H. Webb (M. C.); R. C. Young (L. S. & I.).

SPECIAL COMMITTEES.

Uniform General Contract Forms.

1. Complete report on general contract forms.

W. G. Atwood (L. E. & W.), chairman; J. C. Irwin (Rutland, Vt.), vice-chairman; C. Frank Allen (Massachusetts Institute of Technology); E. F. Ackerman (L. V.); W. L. Breckenridge (C. B. & Q.); R. G. Kenly (M. & St. L.); E. H. Lee (C. & W. I.); C. A. Paquette (C. C. C. & St. L.); H. C. Phillips (A. T. & S. F.); J. H. Roach (L. S. & M. S.); C. A. Wilson (consulting engineer); H. A. Woods (G. T.).

GRADING OF LUMBER.

1. Continue the collection of current specifications, grading and inspection rules for maintenance of way timber and lumber not heretofore reported on, and present same for all classes of maintenance of way timber and lumber, which will conserve the interests of railways and be acceptable to manufacturers' associations; conferring with committees of this association and with other organizations whose work is affected.

Dr. H. Von Schrenk (C. R. I. & P.), chairman; B. A. Wood (M. & O.), vice-chairman; W. McC. Bond (B. & O.); D. Fairchild (N. P.); R. Koehler (S. P.); A. J. Neafie (D. L. & W.); W. H. Norris (M. C.); J. J. Taylor (K. C. S.); F. B. Walker (N. P.).

THE MANUFACTURE OF CROSS-TIES FOR PRESERVATIVE TREATMENT.*

BY HOWARD F. WEISS,
Assistant Director, Forest Products Laboratory.

At the present time the price of cross-ties in this country, other things being equal, depends on the species of wood used and the size specified. The quality for practically all grades is about the same and is usually specified in language somewhat as follows: "All ties must be cut from sound timber of good quality, peeled, free from shakes, loose or decayed knots, or other imperfections that would impair their strength or durability. They must have two parallel faces sawed or hewed smooth with the ends cut square."

It is the opinion of the writer that it would be to the decided advantage of certain railways to consider one other factor in cross-tie specifications as a basis for fixing prices—viz., their sapwood content. This is particularly true for ties intended to be treated.

The number of cross-ties purchased by railways in the United States for four years as shown by the United States Bureau of Census, has been;

Year.	Total.	Hewed.	Sawed.
1907.....	153,703,000	118,385,000	35,318,000
1908.....	112,476,000	91,982,000	20,484,000
1909.....	123,751,000	95,499,000	28,252,000
1910.....	148,231,000	.....	.....

It will be seen that by far the larger number of ties are hewed, the percentage varying from about 75 to 82 per cent. of the total number cut. It is apparent that the methods of manufacture are not undergoing any marked general or permanent changes. The reasons for this are perhaps as follows:

(1) The general impression among railway engineers has been, and in some cases still is, that hewed ties shed water better than sawed ties and hence are more durable. All attempts which I have made to secure authenticated data substantiating this belief have failed, and even if this claim were valid, it would be of no

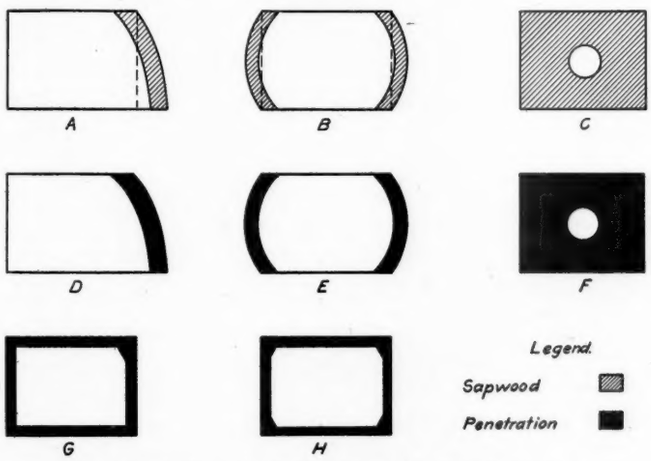
*Modified from an address delivered before the Eighth Annual Convention of the American Wood Preservers' Association.

practical importance when the ties are given a preservative treatment.

(2) Hewed ties are generally cut with a straighter grain than sawed ties, and hence are claimed to have superior strength. This may be true only when the fibers of the wood are at variance with the axis of the tie; and even when the fibers are thus distorted, the difference in the strength of a hewed tie and a sawd tie is probably of little significance, for in both cases more or less of the fibers are bound to be ruptured in manufacture.

(3) In ordering hewed ties it is claimed that the railway gains by securing a volume of wood larger than if the ties were sawed, because when sawed, the ties are cut to fixed dimensions, whereas in hewing they are usually cut only to keep above the minimum dimensions, and this volume consequently is generally greater than that specified. While this claim is unquestionably true in many instances, nevertheless it is more than offset by the disadvantage of this method of manufacture.

(4) Perhaps the chief and best reason why most ties now used are hewed is the economic condition surrounding their production. Railways generally secure cross-ties from three sources; from tie companies, from farmers and other holding



Showing Influence of Sap Wood on Penetration of Preservatives.

small bodies of timber along the right-of-way, and from cuttings on their own holdings. It frequently happens that it is easier and cheaper for a farmer to hew a few ties, hauling them to the railway or town for sale, than it is for him to haul his logs to a sawmill and have them sawed. Where such and similar conditions exist, the hewing of ties is justifiable, as it is the best practical means for utilizing the timber. However, there are many instances where large owners of timber could saw it into ties rather than have it hewed, and by so doing would not only bring about a closer utilization of their own material, but would furnish the railway companies with a better product. It is largely this class of operators who can bring about a most immediate improvement in the method of manufacturing wooden ties.

The chief reasons why sawed ties should be used are as follows:

(1) Hewing cross-ties results in waste of much valuable material, the aggregate volume thus wasted being even greater than the volume of the wood in the tie. This is an absolute waste, being put to no use whatever, since the refuse is left in the woods to rot. When logs are sawed into ties rather than hewed, much of this material can often be utilized, especially in the case of large logs which are capable of furnishing more than the volume of one tie. In addition to the boards which can thus be obtained, there is an enormous amount of wood which even now has value as fuel, and there is no doubt but that this value will be increased in the immediate future due to the utilization of the waste wood for the manufacture of other products.

(2) A sawed tie is cut to specific dimensions except when it is made from a small-sized log and only slabbed on two faces. With this more accurate volume, it is much easier when the ties are placed in a treating cylinder, to determine the absorption of the preservative per cubic foot than when the volume of the ties is extremely variable. Most treating specifications call for an absorption of a definite quantity of preservative per cubic foot of wood, and unless the volume of the wood is accurately known, the absorption per cubic foot can not be accurately applied, and the treatment is bound to be at variance with the specification.

(3) More sawed ties can as a rule be piled on a cylinder buggy than hewed ties. This not only increases the output of the plant but decreases the cost of treatment.

(4) Ties are very seldom hewed so carefully that tie plates or rails will bear uniformly upon them; consequently, it is almost invariably necessary to adze hewed ties in order to secure a satisfactory bearing for the rail. With sawed ties such adzing can generally be entirely eliminated.

(5) Hewed ties possess much needless volume and also have much needless weight, hence they are more expensive to handle and transport than ties whose volume and weight are more uniform.

The above remarks apply to present practice. Entirely aside from them there is a very important point in manufacture which is greatly overlooked. It is the distribution of the sapwood in the tie. It is just as logical to specify how ties to be treated shall be sawed or hewed as regards their sapwood content and its distribution, as it is to specify a difference in price due to a difference in the kind of wood. Exceptions will, of course, occur. Sapwood is very easy to impregnate with preservatives, while heartwood in most species is very resistant. This difference in the resistance to treatment between the sap and heartwood of the same tie is often very much greater than the difference in treatment between two ties of widely different varieties of wood. In certain species like the red oak and the ash, which have a very porous structure, this condition is not true, but in the vast majority of cases it is. With most ties composed of part heart and part sapwood, when placed in a cylinder and injected with a preservative, most, if not practically all, of the preservative will go into the sapwood. To secure the best results it is of considerable importance, therefore, to specify how this sapwood should be distributed. The best kind of cross-tie intended for treatment is one which has a uniform distribution of sapwood on all surfaces, as shown at c in the accompanying figure. A tie of this kind can be very e⅓ciently protected against decay.

Unfortunately, only a comparatively small number of ties are of this kind, and even those that are, are usually of low crushing strength. By far the largest percentage of ties now used are composed mostly of heartwood or needless sapwood, as shown at a and b. When ties of this kind are treated according to the ordinary specifications, practically all of the preservative will go into the sapwood in most species, leaving the heart faces with only a superficial penetration. The greatest wear on a tie comes on its face immediately under the rail or plate, and this is the portion which should have the greatest and not the least protection. If ties of the type shown in figures a and b are treated, they can unquestionably be made to absorb the amount of preservative specified—say 10 lbs. per cu. ft.—but most of the preservative will be in those portions of the tie where it will do the least good. If, however, these ties were sawed as indicated by the dotted lines, it would be possible to secure just as long a life from them with a much less consumption of preservative.

For example, consider a modern treating plant having an output of approximately 800,000 ties per year: If the ties are impregnated with 10 lbs. of creosote per cubic foot, the oil costing 6 cents per gal. and the ties containing approximately 3 cu. ft., the total amount of the oil used would be approximately 24,000,000 gal. If the ties had been cut as indicated in the sketch, it

would be possible with a consumption of about 6 lbs. of creosote per cu. ft. to protect them as effectively as with 10 lbs. in the former case. This would result in a net saving of approximately 4 lbs. per cu. ft., or 12 lbs. per tie, equivalent to about 9 cents per tie for cost of preservative, or $72,000 in one year's operation of the plant.

There are other ways in which this point could be argued. For example, if this unnecessary sapwood were removed, could not the life of the tie be increased over what it would have been, provided the quantity of oil injected in both cases remained the same? A company would be justified in paying more for properly sawed ties intended for treatment than for ties which are improperly sawed or hewed, especially when the treatment is one using straight coal-tar creosote. It is the author's opinion that roads using this method of treatment could very well afford to insert another clause in their specifications for cross-ties, concerning the amount and distribution of sapwood, and even go to the extent of paying a higher price for ties in which the sapwood was properly distributed. They would thereby save an appreciable item in the cost of treatment. The roads which do not use treated ties or which adhere to a zinc treatment would not be benefited to the same degree by a requirement of this kind. The difficulties in putting it into practical use would, in some cases, be insurmountable, but where conditions of production are such that a requirement of this kind could be employed, it is believed its adoption would unquestionably result in decided profit.

In the accompanying sketch figures A, B, and C represent the cross sections of three ties, the shaded portion being sapwood and the white, heartwood. The dotted lines show how these ties could be improved by slabbing the sides. If impregnated with creosote, the ties would appear as in figures D, E, and F, showing the heavy impregnation on the sides and the very slight impregnation on the faces in figures D and E. Figures G and H represent ties A and B slabbed on the sides and then impregnated with creosote, showing the even distribution of the preservative and the heavier injection on the faces than in B and D, thereby giving greater protection to the tie where it is most needed and at the same time consuming less of the preservative.

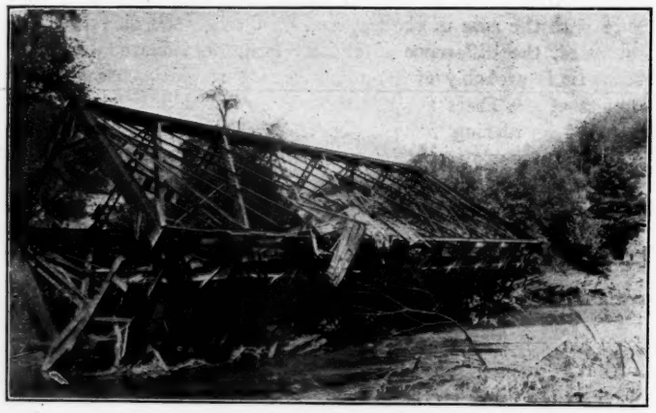
REPLACING STEEL BRIDGES ON THE BUFFALO & SUSQUEHANNA.

The flood resulting from the bursting of the dam at Austin, Pa., on September 30, 1911, in sweeping down the valley gathered up lumber and wreckage, which struck two bridges of the Buffalo & Susquehanna, lifted them from their abutments and deposited them on either side of the track some distance down stream. One, a through-plate girder span 85 ft. long, and weighing 52 tons, was left bottomside up 700 ft. down the creek from its original location in the track. The other, a through lattice truss span, 145 ft. long, weighing, exclusive of the track, 98½ tons, was left on its side 445 ft. down stream with its nearest end 300 ft. from the track. The bottom of the creek being rocky, piling could not be driven, and frame trestles were built in opening the road for traffic. The danger, however, from the large quantities of ice and drift brought down by the spring floods rendered it necessary to replace the truss span, and a contract was accordingly let to the Lackawanna Bridge Company.

The bridge was jacked up on cribbing and skidded across the stream by means of tackle and a hoisting engine, shown in an accompanying illustration. Eighty-lb. rails were laid on cribbing on both banks of the stream with a grade of 15 ft. in 300 ft. to a point by the side of the temporary trestle. When the bridge had been pulled into this position the temporary false work was taken out and the steel bridge shipped sideways into place.

The through plate girder bridge was turned right side up and skidded up one side of the stream to the track. It was then placed lengthwise of the track and jacked up. Rollers were placed beneath it and the plate girder was rolled on top of the temporary trestle across the stream. The bridge was jacked up, the rails and false work taken out from beneath, and the bridge lowered into position.

A small hoisting engine with block and tackle was used to pull



Bridge as Left by the Flood.

the bridges into position. A derrick, engineer and seven steel bridgemen were used, also three local helpers, and a man with a team. F. Herbst, of the Lackawanna Bridge Company, supervised the work. The railway company took out the temporary

Bridge After It Had Been Righted.

false work and replaced the abutments, also laid the new track on the bridges with a crew of eight bridge carpenters. This work was under the supervision of Daniel Fitzpatrick, master carpenter.

REMOVING SNOW FROM SWITCHES.

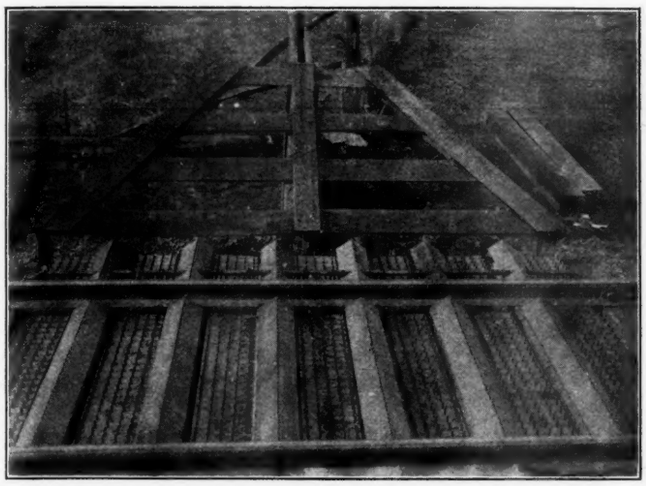
BY M. GANLEY,

Roadmaster, Atchison, Topeka & Santa Fe, Argentine, Kan.

On March 23 we had 25 to 30 in. of snow in the vicinity of Kansas City. To eliminate the difficulty of keeping the switches open by sweeping where the wind and engines quickly dragged the snow back, I used the following method: Two 12-in. x 14-in. bridge caps were laid across the rails, one on top of the other, with a track tie on top of the caps. A loaded 50-ton coal car was pushed up against these caps and a second track tie inserted between the wheels and the lower cap. A switching engine then pushed this coal car with the timbers ahead of it down the switching leads, which leveled off the snow to the top of the rails in the same manner as ballast is frequently leveled. Fifteen men were used to clean switches behind the car, and eight men handled the timbers. In six hours this force was able to clean 12 leads with about 160 switches. The snow between the rails was pressed down quite solid and appeared to melt off a great deal faster than where it was lying loosely.

A NEW TYPE OF TRACK CATTLE GUARD.

The Kent Oscillating Cattle Guard Corporation, Johnson City, Tenn., recently has placed on the market a new type of track guard for highway crossings, which has been used successfully by several railways in the southeastern part of the United States. Guards of this type placed where semi-wild cattle and hogs of the mountain sections have been accustomed

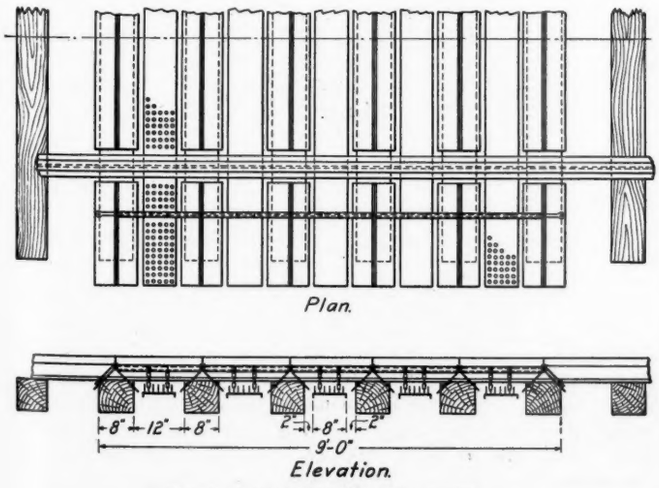


Kent Oscillating Cattle Guard in Track.

to follow along the right-of-way, are said to have blocked effectually the passage of such stock.

The details are shown in one of the drawings, and the accompanying photograph gives an idea of the guard in place. The guard can be made for any length of track desired. The one shown here occupies the space between eight cross ties. On each of the six intermediate ties is placed a cover presenting a sharp angle at the top. This cover has been made of wood, but metal can be used if desired. It comes about half way up on the rail. In the peak of the cover are placed spikes or a saw tooth extending up to the level of the head of the rail.

Two 1-in. iron rods extend the length of the guard parallel

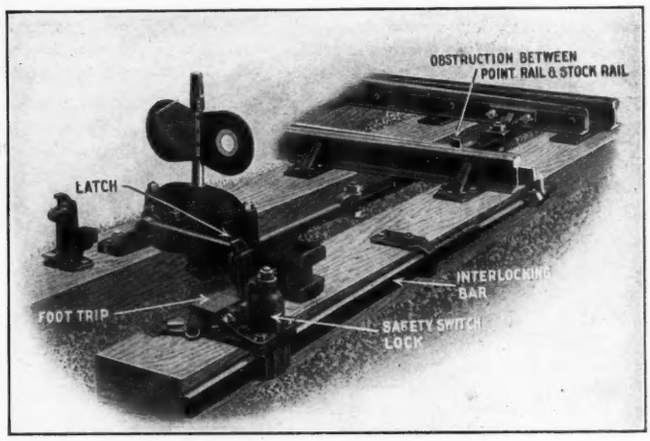


Kent Oscillating Cattle Guard.

with the rails, about 1 ft. from each end of the cross ties. These are fastened securely to the tie at both ends of the guard. Flat pieces of board or steel, 8 to 10 in. wide and occupying the space between the ties, are suspended from these iron rods at the four corners by chains attached to the iron rods. These boards are just wide enough to swing clear between the ties, and extend 6 in. beyond the end of the latter. The upper surface is studded with rows of spikes spaced 1½ in. apart and extending up 2½ to 3 in. At least a 4-in. clearance is left under the boards so they may oscillate beneath the rails. The chains by which the boards are suspended are attached either by a washer or a clevis. The covering on the ties and the oscillating boards extend out to the wing fences, leaving no room for pigs or other small animals to pass between the guard and the fence.

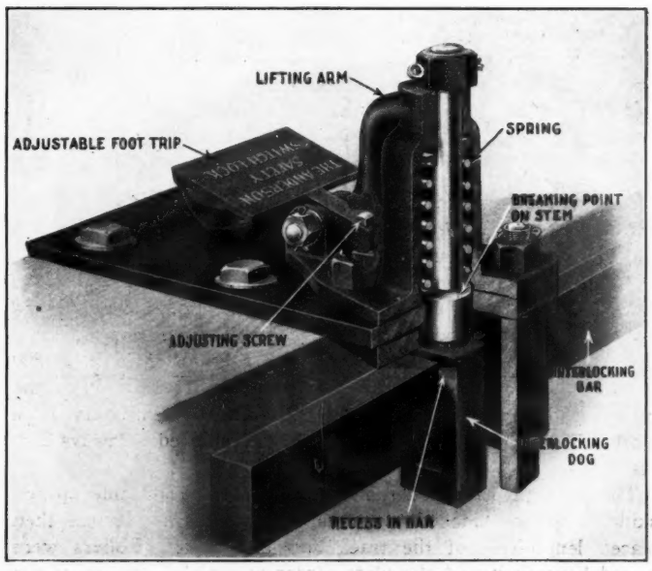
THE ANDERSON SAFETY SWITCH LOCK.

An improved type of switch lock in combination with a switchstand has recently been placed on the market by the American Valve & Meter Company, Cincinnati, Ohio. The interlocking feature insures the closing of the switch before the stand is padlocked and prevents the switch from opening under a train if the switchtstand should be destroyed or the switch rods disconnected. The lock is separate from the switchstand, although one lever operates the switch, the lock and the target in one movement. The mechanism is enclosed to protect it from snow,



Installation of Anderson Switch Lock.

ice or dirt. The interlocking feature is provided by a dog which, when the switch is in the closed position, engages a notch in the lock rod connected to the switchpoint. This dog is made to drop quickly into the notch by a coil spring around the stem which supports it. A foot trip which operates a lifting arm is provided to raise the dog out of engagement with the notch when it is desired to open the switch. This foot trip also operates the latch which holds down the operating handle of the switchstand. The same downward movement of the foot trip which unlocks the lock rod also releases the handle, allowing the



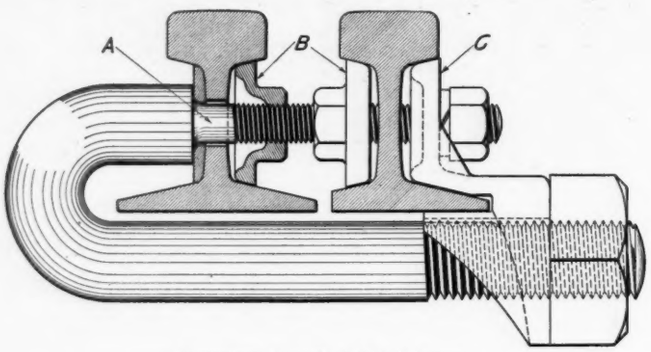
Details of Anderson Switch Lock.

lever to be thrown to open the switch. When the switch is closed this lever is thrown over into the latch, and if the switchpoints have actually moved to the closed position and the block rods are not disconnected the interlocking dog will drop into the notch in the lock rod, which will raise the foot trip and allow the counterweighted latch lock to engage the switchstand lever. In this position the holes provided in the latch for the padlock are uncovered, allowing the mechanism to be securely locked with the switch in the closed position. In the design of the stem supporting the interlocking dog, a short length just above the dog is reduced in cross section to provide a point which will be weaker than any other portion, and will break first in case the stand and lock are struck by a mail sack or similar object. If the stem is broken at this point the lock is still operative to hold the switch closed.

A NEW TENSION GUARD RAIL CLAMP.

The difficulty of holding a guard rail in position has long been recognized. Many roads have been drilling both the main and guard rails and inserting cast iron separating blocks passing bolts through both rails and blocks to maintain the flangeway. These bolts have broken so frequently that other clamping devices have of necessity come onto the market. The common forged yoke with filler blocks and wedges as now seen on the main lines of most of our large systems.

The illustration shows a device for clamping a guard rail



Tension Guard Rail Clamp.

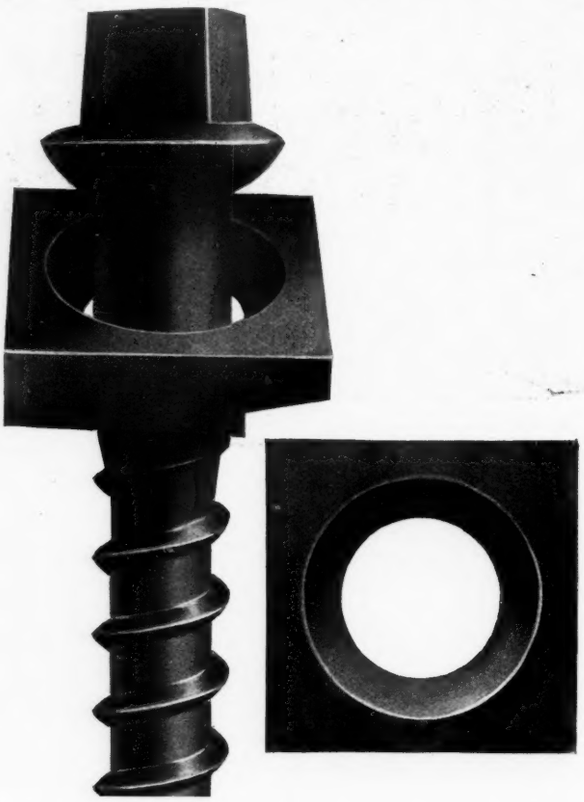
which is always kept in tension, similar to a link of a chain, and which is now being carefully tested out in the track. It is made of 2 in. round stock, wrought iron, reduced to 1 in. diameter where it passes through the rails and separating the spool fillers. At the point of reduction, "A," a fillet is formed which matches with one on a cast washer that fits in the fishing space of the main rail. The reduced portion of the bolt is threaded to allow for the adjustment of spool fillers "B," which can be tightened with the standard wrench required for 1 in. track bolts.

To brace the guard rail a casting, "C," is attached which permits the large end of the bolt to pass through its lower portion and the smaller end through its upper part, both ends of the bolt being fastened by nuts, thus forming a continuous link about both rails permitting them neither to spread, cant nor tilt. The spool fillers act as a nut locking device upon the outside nut, as they relieve a considerable amount of the strain on the bolt. Coming in contact with both the underside of rail head and upper side of rail base, they are thus kept tight. As the rails wear through the throat, the track walker can easily adjust the fillers by using his wrench. Both the large nut and small one can be locked by the use of sheet metal washers that can be bent over the flat of the nut. The cost of the tension clamp is very little more than that of the ordinary bolt and filler block.

Another type of the same device using square filler blocks with adjusting corrugations, has also been developed. Both types are made by the Q. & C. Company, New York.

THE UNIVERSAL COMBINATION SCREW SPIKE.

One of the most recent developments in the screw spike field is the Universal Combination screw spike, the essential feature of which is the clip, or washer, which is so designed that the head fits into it in the nature of a ball and socket joint. It is essentially a standard screw spike with the underside of the head hemispherical in shape to fit into a depression of the same shape in the washer. This construction enables the washer to adjust itself so that it affords a full bearing for the head of the spike



Universal Combination Screw Spike.

and compensates for any inaccuracies in boring the tie or driving the spike. With this clip the spike can be used with any tieplate, or even without a tieplate. The bearing on the rail is secured for the full width of the clip, and as the spike is driven close to the rail the portion bearing on the base of the rail is in compression between the flange and the spike. This spike is made by the American Iron & Steel Manufacturing Company, Lebanon, Pa.

The permanent survey of the railway from Parkes, New South Wales, to Peakhill has been completed. It has not yet been decided as to when construction work will be begun. A proposal for a railway from Redhead to Swansea, New South Wales will be submitted to the Public Works committee.

The yards of the Cotton Belt and Iron Mountain routes at Bird's Point, Mo., on the Mississippi river just above Cairo, Ill., have been threatened by floods at three different times. The cost of protection work for the last two floods was given by A. M. Van Auken in a discussion before the American Railway Bridge and Building Association. In 1897, 5,200 lineal ft. of bank were riprapped at a cost of $37,028. In 1903 the so-called David Neale system was used for a distance of 4,700 ft. at a cost of $29,140. In 1905, however, all of the Neale protection was gone and all but 400 ft. of the riprap.

General News Section.

The Chicago, Milwaukee & Puget Sound was fined $100 on each of 33 counts for violation of the federal 16-hour law, in the United States district court at Spokane, Wash., on April 10.

Effective on May 1, the Master Car Builders' rules of interchange will be adopted without exceptions on all of the St. Louis terminal lines, following the adoption of a similar practice in Chicago on April 1.

The car sheds and a small repair shop of the Illinois Central at East St. Louis, Ill., were destroyed by fire in the company's yards on April 9, causing a property loss of approximately $75,000 and the death of a mechanic.

The Denver & Rio Grande has made an adjustment with its employees by which the firemen will receive an increase in wages of 7 per cent., and the management will make no objection to the affiliation of 95 per cent. of the yardmen with the Brotherhood of Railway Trainmen.

Officers of the Harriman Lines have announced that hereafter supplies will be bought, wherever practicable, in "home" territory. President Sproule of the Southern Pacific says that the company expects to spend between $4,000,000 and $5,000,000 a year in California for supplies.

According to a press despatch from London, April 10, experiments made by British army officers, in conjunction with the Marconi Wireless Telegraph Company, have resulted in sending messages both to and from an aeroplane flying in the air, at points several miles from the station on the ground.

Fifteen pleas of guilty were entered in the federal court at Topeka, Kan., on April 8, by railway companies charged with violations of the 28-hour law in the transportation of live stock. Fines of $100 were imposed for each violation, except in the case of the Atchison, Topeka & Santa Fe, which was fined $25 on each of 19 counts.

St. John's Orphanage, Philadelphia, is now called the John Edgar Thomson School. The privileges of this school are for the daughters of employees who have been killed while in the discharge of their duty in the service of the Pennsylvania Railroad. The school was endowed by John Edgar Thomson, late president of the Pennsylvania.

W. B. Spaulding, chairman of the Central Safety Committee of the St. Louis & San Francisco, has addressed a communication to each of the governors of the states through which the Frisco lines run, asking them to co-operate with the company in reducing the number of accidents resulting from the large number of trespassers on trains and on the right of way of the railway.

The bill which is under discussion in Congress to extend to other industries the Erdman law, providing for mediation in disputes with employees, has the support of Judge Knapp and Commissioner Neill, mediators under the present law, who appeared before the House committee this week and advocated the extension of governmental mediation to all branches of industry.

The second annual convention of the National Drainage Congress, which was organized in Chicago last fall, was held at New Orleans, La., April 10-14. About 400 delegates, representing about 30 states were in attendance. The congress was organized for the purpose of promoting a policy of reclaiming overflowed lands similar to that adopted with reference to irrigation.

At a meeting of the legislative committees of the four principal railway brotherhoods at San Antonio, Tex., on April 11, resolutions were passed protesting against the policy of the Mexican government in discriminating against American railway employees in an alleged effort to eliminate them from the service of the Mexican railways for the purpose of replacing them with Mexicans.

Superior Court Judge James C. Rives of Los Angeles county, California, holds a remarkable record for travel over one line of railway. Judge Rives lives in the town of Downey, which is about twelve miles from Los Angeles on the Southern Pacific, and every weekday for 27 years he has traveled back and forth, a total of over 130,000 miles. During this time the schedules of the trains on which he rides have not been changed more than 10 minutes.

The Central Vermont has awarded to the Harlan & Hollingsworth Corporation, of Wilmington, Del., the contract for building the two new steamers recently announced, which are to be run between New York and Providence. These steamers will each be 332 ft. long and 48 ft. beam; and will carry 700 passengers and 500 tons of freight. The steamers are to be finished in about one year.

A meeting of the representatives of the machinists, blacksmiths', carmen's, boilermakers' and sheet metal workers' organizations on western railways was held at Kansas City this week for the purpose of organizing a federation of shop employees of all railways west of the Mississippi river. The movement is an outgrowth of the organization of federations of the employees of the Illinois Central and the Harriman lines, which led to the shop strike last fall.

The American conductors and enginemen employed on the Northern and Gulf divisions of the Mexican national railways all left their work on April 17, the cause of the strike being the refusal of the officers of the road to limit the percentage of Mexicans who should be employed as conductors and enginemen. It is said that President Garretson, of the Order of Railway Conductors has approved the strike of conductors, and that 600 members will be affected.

The Kansas City Board of Trade has passed resolutions addressed to the receivers of the Kansas City, Mexico & Orient and to Judge J. C. Pollock, who has jurisdiction over the receivership, protesting against a proposed removal of the general offices of the road from Kansas City to Wichita. The resolutions state that the board is especially desirous of having the offices maintained at Kansas City, in order that the increasing grain business may be facilitated by the presence of the general officers.

The proposition before Congress to establish the United States government as a builder of railways in Alaska has been expanded into a bill proposing that 1,000 miles of line be built, and that a commission of five persons be appointed by the President to take charge of the enterprise. This bill, which has been introduced by Senator Smith, carries an appropriation of $1,000,000 and provides for the issuance of bonds. This proposal seems to be independent of, and perhaps in conflict with, that which was laid before Congress by the President.

On April 12, Grand Chief Stone of the Brotherhood of Locomotive Engineers, informed the managers that the enginemen on the 50 eastern roads had voted 93.3 per cent. in favor of supporting their representatives to the extent of declaring a strike if necessary. He asked that the managers offer some proposal which would bring about a settlement. The committee of managers met on April 17 to consider the situation, and continued the meeting to the following day. It is expected that an early meeting between the managers and the representatives of the enginemen will be arranged for.

The Wisconsin division of the Chicago & North Western has been awarded a banner for having the best accident record during the year of the divisions of the road, taking into consideration the volume of business done and other conditions. The banner was presented by President W. A. Gardner, with an address, at a meeting of the division officers and employees composing the division safety committee on Monday. The Wisconsin division is the one on which Mr. Gardner received most of his early training. Last year the banner was awarded to the Sioux City division.

The Interstate Commerce Commission has issued the report of Inspector Belnap on the rear collision which occurred at Odessa, Minn., December 18, in which 10 persons were killed. The conclusion of the inspector is that the accident was caused by the failure of the flagman to properly protect his train. A contributing cause was the despatcher's directing the operator to admit the second train to the block while it was still occupied by the first. And three other persons are at fault; the con-

ductor for entering the block which he knew was occupied without first having a permissive card; the operator for the same fault, and the operator at Odessa for leaving his signal in the clear position while taking an order from the despatcher. The report describes the construction of the steel passenger cars, and has five full page half-tone illustrations showing the condition of these cars after the collision.

The Southern Pacific in Mexico suffered seriously last week from the revolutionary disturbances. In the state of Sonora several bridges were destroyed and trains were attacked by the rebels, who, it appears, were probably Yaqui Indians. On April 10, a few miles south of Guaymas train No. 1, on which was vice-president Charles Hine, was fired on by a dozen armed men, and one passenger was killed. The engineman did not stop, however. On the same day train No. 2 ran on to a burned bridge near Empalme and the engine was wrecked; the engineman and fireman were killed and three other trainmen injured. Two other bridges were destroyed by fire.

The St. Louis & San Francisco on April 11 withdrew from service its fast mail train No. 1, running between St. Louis and Vinita, Okla., and carrying eastern mail for Oklahoma and Texas points. The Missouri, Kansas & Texas also discontinued the connecting mail train between Vinita and the Texas cities. Mails that have been carried on these trains have been transferred to the Frisco's California Express. The discontinuance of the trains is said to have been caused primarily by the action of the postoffice department in sending periodicals by freight, and thereby curtailing the amount of mail to be carried on mail trains. It is also said to be part of a general policy of retrenchment which has been manifested on both roads.

At the annual meeting of the United States Steel Corporation, held in Hoboken, N. J., this week, a committee of stockholders of which Stuyvesant Fish was chairman, made a report on the labor conditions at the mills of the corporation. The committee finds that 26 per cent. of the employees work 12 hours a day, mostly in rolling mills and other places where the process is continuous. The committee declares that the seven day week is detrimental to the employees morally and physically. Much of the Sunday work was done away with several years ago, and the committee believes that most of the rest of it can be abolished; but the reform will be difficult unless other mills will also carry it out. A proposal by one stockholder that the work at the steel mills should be done in three shifts of eight hours each was discussed, but was withdrawn. The committee finds that many employees desire to work long hours in order to increase their income. Complaints that by the piece work and bonus systems the men were oppressed are declared to have no reasonable foundation.

The educational bureau of the Illinois Central has announced the company's plan for paying employees for useful ideas. It is a combination of the Pennsylvania Railroad's plan (*Railway Age Gazette,* January 26, 1912, page 163), with the added offer to recognize and pay for suggestions that are in use only locally. Each employee is offered the opportunity to present to the educational bureau for consideration any idea he may have thought out or worked out for promoting the interests of the company in any manner. Such ideas may be original in so far as the company is concerned, may be adoptions of plans that have been heard of or that may be in effect on some other railway, or may be descriptions of quick and economical ways and means of doing various kinds of work, which have been put into practice locally and which have proven that they were successful. The bureau calls attention to the wide field for suggestions, particularly along the line of improvements in station service, reductions in the number of reports necessary, improvements in terminal work, switching, etc., systematizing of files and office methods, filing of tariffs, reductions in claims and accidents, reduction of damage to equipment, etc. It may be a plan some section foreman has for reclaiming scrap material or repairing tools, it may be a handy device some shop machinist has put into use, it may be a system some yard clerk has worked out, it may be a method some agent or conductor has for handling passengers or freight in a manner to win praise for the company. The advisory board of the educational bureau will pass on and judge all suggestions offered. Such suggestions as are deemed suitable for adoption, will be properly recommended and presented to the management. If the management accepts a suggestion and puts it into effect, the advisory board will then decide on a fair and proper recompense to be made to the employee.

Rail Conference in Indiana.

At a meeting of the Indiana Railway Commission on April 16, the discussion of rail failures was continued from February 20. J. P. Sayre, New York Public Service Commission, C. E. Elmquist, Minnesota Commission, and Judge Wood, of Indiana, from the committee of the National Association of Railway Commissioners, also attended. Dr. Dudley, of the New York Central, presented a paper outlining recent developments in rail manufactures. He expressed a strong prejudice against a definite amount of discard being specified, but urged shearing the ingot to secure sound metal. He said that the physical properties of rails have been developed so that the rail used today better withstands wheel pressures than formerly, and that strains and deflections of rails have been materially reduced by better maintenance standards. He urged great care in mill practice, saying that it is possible to secure good rails with proper care at the mills. W. C. Cushing, Pennsylvania Lines, urged great care in analyzing the statistics furnished by roads to the commission. The term "rail failure" is very apt to be misleading, as it includes all rails removed from track because of any defect, while but about one-fifth only of rail failures are broken rails. The only dangerous rail failures are broken rails; although the public believes that all rail failures are broken rails. Mr. Cushing also called attention to the fact that railways are not seeking hardness in rails, but toughness and ductility, and that the material in rails must be such as to carry trains at required speeds with perfect safety. President Delano of the Wabash, President Buffington of the Illinois Steel Company and Professor Benjamin of the University of Illinois, also discussed the subject. The commission announced that it would visit the South Chicago and Gary rail mills with railway men and manufacturers on April 23 and 24. The commission is collecting statistics of all rail failures within the state, and will compile these yearly.

Co-operation Campaign on the Southern Pacific.

F. G. Athearn, manager of the bureau of economics of the Southern Pacific, has adopted a plan, since the first of the year, of addressing frequent circular letters to employees of the company, or to particular classes of employees, urging their co-operation with the management in improving the quality and efficiency of the service. The letters are sent out with the pay checks and are written in a breezy style intended to impress upon employees the importance of each individual in the service. They are asked to "come back" with replies making suggestions concerning ways of improvement, and are told that every man who makes a suggestion which will improve the service will receive recognition and credit for his ideas. When a suggestion is sent in, an abstract is made, to put it into brief and clear form. It is then given a number, which is also placed on the letter. The abstract, with no indication of identity is then sent to the head of the department interested, who is asked to make a report on it. Some extracts from the Mr. Athearn's letters are as follows:

"Make a special effort during February to bring your dealings with the public onto a personal basis; that is, try to make every man with whom you do business feel that he is dealing with you personally and not with an impersonal corporation. After all, you are part and parcel of the railway. Have you ever thought of that? Then, whenever you are able to remove a prejudice from the mind of anyone, get his name and address and send it in to me. I want the management to know the men who are boosting for us.

"Then, again, if you can succeed in getting any additional business at your station, especially if it is competitive business, I want you to tell me about it and give me the names and addresses of the new customers you have secured. Many a good man is working hard for the interests of the company and we want to know about him personally.

"I want you to tell me some of the selling stunts you have hit upon, and how they worked. Describe some of the cases where you, personally, were responsible for a shipment going via Southern Pacific, instead of some other route. When we come to get our new promoting plan into operation, I want to know

who of you are alive and awake, who are doing more (maybe only a wee bit more, but more) than you have been ordered to do.

"The Bureau of Economics is not going to do any ordering. It's going to help; to boost, not knock. It's the good things you do that are interesting me. And I am having all the facts you send me put on a little card, one card for each agent. You're going to have a reason now for doing a little thinking. You know someone is watching, ready to give you credit for your ability. See the point?

"So start in right now. If you really want to be advanced, to get out of the rut, advertise yourself. Let me know who you are and what you are doing. Perhaps you have felt, sometimes, that the man who is working right under the nose of the officials has a better chance for promotion than you. If you do, write. Get under the nose yourself. Now's your chance. Will you make the most of it?"

One letter was devoted to explaining the importance of courtesy in dealing with the public, and was illustrated with several incidents. Another dealt with the subject of neatness. Mr. Athearn has received a ready response to the letters, including a large number of suggestions as to various details of the service.

Medals for S. P. Employees.

The Southern Pacific has awarded medals in the annual competition for the best condition of stations, divisions, roadmasters' districts and sections, in accordance with the decision of a committee of engineers after an inspection trip over the lines. The coast division, of which Thomas Ahern is superintendent, carried off the honors for the best division, both the best roadmasters' districts and the best section of track and roadbed being on this division. Gold medals were awarded to the foreman of the best section and to the roadmaster of the best district. Silver medals were awarded to the agents at 27 stations, to 21 pumpers, to three fuel oil plant tenders and to six foremen of power plants. Forty-four silver medals were awarded to the section foremen who had the best sections in each roadmaster's district.

Baltimore & Ohio Strengthens Chicago Organization.

The announcement in the Elections and Appointments department that Frank C. Batchelder has been elected president of the Baltimore & Ohio-Chicago Terminal Railroad, and assistant to the president of the Baltimore & Ohio, with headquarters in Chicago, is indicative of a policy on the part of the Baltimore & Ohio to become more closely identified with the interests of the city of Chicago.

When the Baltimore & Ohio took over the Chicago Terminal Transfer in April, 1910, and reorganized it as the Baltimore & Ohio-Chicago Terminal Railroad, Mr. Batchelder was elected vice-president and placed in immediate charge of its operation. Until it had acquired this property at a cost of over $30,000,000, the Baltimore & Ohio could not be said to be really in the city of Chicago, although it did reach the outer limits of the city with its own rails, and shared with other tenants a joint lease of the terminal property. President Daniel Willard was located in Chicago for six years as vice-president of the Chicago, Burlington & Quincy before going to the Baltimore & Ohio, and while in that position had opportunity to learn the importance of Chicago from the transportation standpoint. Since going to the Baltimore & Ohio he has continued not only to take a very active personal interest in the Chicago terminal itself, but also has urged and carried forward extensive improvements on the main line between Chicago and the East—particularly in the way of additional double track; and it is stated that within the next three months when the improvements now under way are completed, the Baltimore & Ohio will be double-tracked for the entire distance between Philadelphia and Chicago, with the exception of 34 miles, and it is expected that this remaining distance will be double-tracked in the near future.

In recognition of the great possibilities for traffic development to and from Chicago, it has been decided by President Willard that not only should the president of the Baltimore & Ohio-Chicago Terminal Company be actually located in Chicago, which is to be the case in the future, but he has also decided that the interests of the Baltimore & Ohio would be better served by having an assistant to the president located in that city. It is understood that Mr. Batchelder will be authorized to represent the president in all matters likely to come up at the western terminal, and that it will be the policy of the Baltimore & Ohio to co-operate with its shippers and friends located in the West, in every possible way for the mutual benefit of both.

President Willard and Mr. Batchelder have been personal friends and business associates for more than 30 years, and the selection of Mr. Batchelder for the important position to which he has been appointed, may be taken to indicate not only the deep interest which President Willard himself takes in the western terminal of the Baltimore & Ohio system, but also that because of his acquaintance with and knowledge of Mr. Batchelder's ability, he will probably give him greater authority than is usually given to men occupying similar positions.

Reduced Casualties on the North Western.

The Central Safety Committee of the Chicago & North Western reports that for the 15 months ending April 1, 1912, the number of passengers killed on that road, as compared with the preceding period of 15 months (ending December 31, 1910) fell off 57 per cent. The number of employees killed fell off 23 per cent., and of other persons 11 per cent. Injuries (not fatal) also showed marked diminutions. Other decreases for these two periods are as follows:

		Per Cent.
25	fewer trainmen killed	53.2
1,790	" trainmen injured	44.5
5	" switchmen killed	26.3
132	" switchmen injured	16.5
1	" stationmen killed	25.0
120	" stationmen injured	14.7
940	" trackmen injured	42.7
120	" bridgemen injured	29.8
5	" car repairers killed	71.4
13	" car repairers injured	3.5
1	" shop and R. H. men killed	14.3
214	" shop and R. H. men injured	13.2
1	" other employees killed	7.7

There was an increase of 7 trackmen killed, 2 bridgemen killed, and 13 other employees injured.

Unfilled Tonnage of the United States Steel Corporation.

A report of the United States Steel Corporation shows that on March 31 the unfilled tonnage was 5,304,841 tons. This compares with 5,454,200 tons at the end of February, 1912; 5,379,721 at the end of January, 1912, and 3,447,301 tons at the end of March, 1911. The decrease in the unfilled tonnage of March from that of February was 149,359 tons. It had been expected that there would be a decrease of from 150,000 to 200,000 tons. This showing indicates that during March the Steel Corporation received orders for new business at the rate of about 34,000 tons a day, and that shipments were about 40,000 tons a day.

Joint Ownership of City Terminals.

A plan for the joint ownership and operations of railway terminals in large cities with the municipality as the joint partner was outlined by W. L. Ross, vice-president of the Chicago & Alton and Toledo, St. Louis & Western railways, in an address before the Peoria Transportation Club on April 12. In introducing the subject, Mr. Ross referred to the great change in the attitude of the railways to the public and spoke also of the trend of railway regulation, saying that the managers of railway property must be prepared to meet the demand for more and more supervision, and that of a more centralized character, even extending to jurisdiction over the question of whether new roads shall be built; and their issues of securities. In this extension of supervision the Interstate Commerce Commission should be so organized as to represent the various states as well as the federal government, possibly divided into sub-committees having jurisdiction over various phases of the transportation problem. One of the greatest of these problems, in his opinion, involved the economical use of terminals without waste or duplication, to give satisfactory service to the communities dependent upon them. On the subject of terminals he said in part:

With proper terminal facilities everywhere the service offered by the railways would be greatly improved, and that with a marked saving both to the roads and the communities served by them. Under the old system of competition, without supervision, communities and commercial centers always thought that separate terminals and a number of lines entering these centers was an added guarantee that the roads were acting independently, and that they thus had an added guarantee of genuine competition. With the commission's supervision this is unnecessary, because the rates are fixed, and there can be no discrimination.

It would be in the interest of both efficiency and economy if all commercial centers reaching industrial importance, as an

illustration, had one common terminal, around which, at a distance to be determined by local conditions, including the distribution of industrial and manufacturing plants, would be a boundary line, marking a zone, which would be served by one terminal company.

This company would make rates to and from all tracks and facilities located within the zone, serving all railways that were built to a point connecting with the terminal line. And it should do this at a cost not exceeding the interest on bonds, maintenance and operation of the terminal company.

Of course it may be argued that railways having advantages in terminals in a city like Chicago would be the losers in having to give up their terminals. But in roughly sketching this proposed plan it is no part of my intention to have them give up these terminals. The terminal company should issue bonds guaranteed by all the railways using the terminal company's tracks and facilities, to pay for the individual facilities of each line as at present organized and operated. Each line would then be an equal owner with each other line in the city of Chicago in all the terminal facilities within the zone so defined. There would be neither injustice nor confiscation.

I believe that as a further guarantee of fairness to all and a just consideration for the general good that the city itself should be a co-partner with the railways in such terminals. And as such the city should have properly selected representatives on the board of the terminal company. This arrangement would eliminate the question of compensation for the use of streets, and it would take away the consideration of additional track construction from the political standpoint of the city. Nor should the city be a non-participating partner in the arrangement so far as financial consideration and recompense is concerned. The details of such a co-partnership should be worked out on the basis of a percentage of earnings and worked out in a way that would be fair to the city.

To carry this illustration a little further: Suppose such a company organized to operate the tracks of all the railways within the present territory known as the switching district of Chicago and to be known under the new organization as "the switching zone." Under this arrangement there would be no industrial tracks, no tracks of any kind or character for steam railways, to be owned, or constructed, or operated in the city, excepting those belonging to the terminal company, plant facilities excluded. This terminal company to be owned, share and share alike, by all railways reaching a physical connection with the terminal. This would have the effect of giving all shippers located within the zone access to all territories on any and all railways reaching the connection with the terminal, at the established Chicago rate.

The present property would, of course, be appraised, and all lines holding terminals should be well compensated for them. It could not be charged that there was any confiscation of terminals. Neither can it be charged that there would be any element of selfishness in such a plan. In the case of a road having very fine terminals, in consideration of giving them up, it would have access to all terminals and tracks within the city of Chicago, and there could be no discrimination because all shippers would alike have access to all parts of the city.

The earnings of such a terminal company, so organized, should represent the interest on the value represented by bonds, the operating costs and its maintenance, and each line should pay to the terminal on the business handled for each line by the terminal sufficient to simply produce these results. The absorption of switching charges for all these lines would be materially reduced by such a plan.

The operation of the entire terminals by one company would eliminate the duplication of switching tracks and switching service to a great extent; it would also eliminate many hazardous crossings. There would be a further saving in the decreased number of switch engines that would be needed to handle the business. And this in turn would, to some extent at least, decrease the smoke nuisance. The city having an interest in the terminal company, it would simplify the questions relating to the crossing of streets and increased trackage. Having an interest in the earnings, these questions could be reduced to a strictly business basis.

Suppose under this broad commission plan that I have outlined they should authorize the construction of another line between Chicago and some other business center. When such a new railway was constructed to a point giving physical connection with the terminal company's lines, it would be allowed access to all terminals within the city on the same basis as all other roads, by taking an interest in the terminal company on the same basis as the other roads. The plans would expand to meet all the growing demands for transportation. The handling of traffic from one point in the zone to another point within the zone would be on the scale basis, the same as it would be to any other part of the state.

I have thus briefly sketched a plan which I believe would bring relief to the transportation industry at one point where relief is greatly needed. Of course the plan is based upon the fundamental idea that the commission is to actually supervise all of the railways, take them out of the class known as industrials, and bring about a condition of uniformity and prevent discriminations of any kind and character. If this idea were carried out in all commercial centers of importance, industrially and commercially, it would entirely solve the terminal problem. It would eliminate the switching feature, and it would wipe out all discrimination as between different localities in the same city and place all manufacturers and shippers in the city upon an equal basis. Another advantage would be that all terminal charges would be absorbed between all points; and it would not be burdensome to the railways. Such a plan would, in my judgment, be along the lines of efficiency and economy, and should produce service and conditions that would be entirely satisfactory to all concerned.

Damage Suits in Toronto.

A suit for damages for alleged personal injury, which came up before Judge Morgan and a jury in the county court at Toronto, Ontario, March 28, against the Toronto Street Railway, proved to be fictitious, the plaintiff being a detective who, it appears, had been engaged by the company to bring the suit for the purpose of sustaining its charge that the company suffered from fraudulent suits brought in the courts. The plaintiff was Alfred Burnett; and "a prominent physician" testified that Burnett, last October, suffered from a sprained back, was disabled for three weeks, and was still unfit for work. Following this testimony, Burnett went on the stand and swore that he had been in no accident, and that the injuries which he had led the physician to believe real were mythical. Burnett said that he had suffered no injury and that he went out daily during the time that the doctor was visiting him.

How this kind of proceeding is looked upon by the court is suggested in the report of a grand jury presented April 11, which includes a true bill against Robert J. Fleming, general manager of the street railway; James H. Forrest, claims agent; J. Walter Curry, K. C., and Albert Burnett and W. E. Smalling, employees of a private detective agency, charging them with having conspired to fabricate evidence in connection with false cases for damages for injuries brought in the names of Burnett and Smalling; to pervert and obstruct the courts, and with having conspired to commit contempt of court. The fifth count is that the men conspired to commit the crime of bringing one of his Majesty's courts, one of the judges, and the administration of justice into contempt by maliciously, fraudulently and vexatiously procuring . . . . "feigned and fictitious actions, brought to the great scandal, contempt and reproach" of the courts, the judges, the administration of justice and the peace of the King, his crown and dignity.

Investigation of Governmental Regulation.

The National Civic Federation has begun an investigation of the question how far governmental regulation of public utilities may be carried without interfering unduly with the management by the owners. The work will be done under the direction of Dr. John H. Gray, Professor of Economics in the University of Minnesota. Professor Bruce Wyman of the Harvard Law School has been appointed counsel for the investigation. Other experts who have been employed are William D. Kerr, formerly of the Wisconsin Railroad Commission, and Professor I. L. Sharfman. One piece of work already under way is a complete compilation of all the public service laws of the United States (federal and state), Great Britain, the Dominion of Canada and the Canadian provinces. Supplementary to this there will be prepared a summary of all decisions of courts and commissions under the laws so compiled. An expert will be sent to Europe to make a general investigation of public

utilities. The investigation will cover telephone companies, steam and electric railways and water, gas, electric and water power companies.

The work is divided among committees, as follows: Rates, chairman, F. K. Lane; Control of Service, chairman, M. S. Decker; Control of Capitalization, chairman, M. R. Maltbie; Franchises, chairman, B. Lee; Accounts and Reports, chairman, L. S. Rowe; Ways and Means, chairman, F. Q. Brown. The executive committee is composed of well-known members of public service commissions, officers of public service corporations, etc., among whom are the following: August Belmont; Union N. Bethell; William C. Brown (president N. Y. Central); George B. Cortelyou; F. A. Delano (president Wabash); W. W. Finley (president Southern Railway); A. B. Garretson (president Order Railway Conductors); D. O. Ives; J. C. Lincoln; James H. McGraw; William D. Mahon (president Amalgamated Association of Street Railway Employees); T. C. Martin; B. H. Meyer (Interstate Commerce Commission); H. U. Mudge (president Chicago, Rock Island & Pacific); H. B. Perham (president Order of Railroad Telegraphers); W. Z. Ripley; Alfred H. Smith (vice-president N. Y. C.); James Speyer; Charles A. Stone; Warren S. Stone (B. L. E.); George F. Swain; Frank Trumbull (Chesapeake & Ohio), and Daniel Willard (president Baltimore & Ohio).

Proposed Governmental Supervision of Corporations.

The dissolution of the Standard Oil Company and the American Tobacco Company has thrust forward the whole problem of our policy toward industrial corporations. The federal government must have a permanent administrative office through which to supervise interstate corporate business. We want a business machinery of high efficiency, serving the best interests of the citizen and returning ample reward to the ability and industry of those who use that machinery fairly. Two great restraints may be imposed upon business. One is the automatic regulator, competition; the other, direct governmental intervention. It is indeed true that under some conditions even fair competition may result in combination. The further question is then raised, How far is it desirable to *enforce* competition by dissolving such combination? But whatever shall be our ultimate policy, a permanent administrative system is a necessary part of it. That system must have broad powers of investigation, taking continuous cognizance of the operations of large industrial corporations. Such administration by publicity and supervision will preserve competition and provide equal opportunity. By an expert knowledge of current business conditions it will display the working of competition, and the cases, if any, where this fails to be of benefit. It will always have the knowledge and data that may be required properly to enforce competition.

The American Tobacco Co. and the Standard Oil Co. have been disintegrated, and yet the country has no effective means of ascertaining how far the desired reform will really be carried out. No one can forsee the future of these new units in the two great industries. It will be purely an economic and financial process. No judicial machinery is adapted to handle this novel problem. Indeed, the Circuit Court expressly refused the suggestion of the Attorney General that the tobacco case be kept open for three or more years for such purpose of supervision. . . . . The exact form of such an administrative office is a matter for further consideration. The essentials are permanence, expert training, administrative flexibility, effective investigation, and publicity.

The Bureau has published Part III of its Report on Transportation by Water in the United States. Parts I and II having been already published. It has published a summary of Part I of its Report on the Lumber Industry. This dealt with the standing timber of the country, its amount, distribution, and ownership. Part I of the Report on the Steel Industry has been issued. This dealt with the organization, investment, profits, and position of the largest corporation in the country, the United States Steel Corporation.—*From annual report of Herbert Knox Smith, Commissioner of Corporations.*

Entertainment Program for Atlantic City Conventions.

J. W. Taylor, secretary of the Master Mechanics' Association and the Master Car Builders' Association, has sent out to members a circular letter giving details regarding the entertainment features in connection with the conventions of these associations which will be held in Atlantic City, June 12-19, inclusive. The announcement comes from Mr. Taylor this year rather than from the Railway Supply Manufacturers' Association because, as Mr. Taylor's letter shows, the railway associations this year are contributing towards the expense of the entertainment features.

Mr. Taylor in his letter remarks that $1 will be charged for each badge issued to the members of the Master Car Builders' Association, in order to raise money with which to defray that association's portion of the expense, while no similar charge will be made for badges for the Master Mechanics' Association. The reason for this is that the Master Car Builders' Association, being an organization whose members represent the railways themselves, and whose expenses are paid by the railways, has no fund from which to meet this class of expenses, while the membership of the Master Mechanics' Association, being an individual affair of the members, and the money for its support being furnished by them, it can properly take the funds for this purpose from its treasury.

Mr. Taylor's letter is as follows:

At a meeting of the Joint Committee on Arrangements for the conventions in June, it was agreed that the expense connected with entertainments, procurement of badges, and such other details as are necessary in connection with the convention, should be borne by the three associations interested, viz.: Railway Supply Manufacturers' Association, Master Car Builders' Association and the American Railway Master Mechanics' Association, on the following basis:

Music—Daily orchestra concerts on steel pier, Supplymen's Association. Informal dancing, one-third each. Incidental expenses in connection with informal dancing, 70 per cent. by Supplymens' Association, 30 per cent. by other two associations. Musical entertainment, 70 per cent. by Supplymen's Association, 30 per cent. by other two associations. Ball game, one-third each. Badges, cost to each association.

Inasmuch as these expenses are personal in character, being intended for entertainment purposes only, and not such as should be borne by the association, it has been decided, in order to provide a fund to meet them, that there be collected from each member at the time he registers and procures badges for himself, members of his family and guests, the sum of $1 for each badge so procured, the fund thus obtained to be used under the direction of the Joint Committee on Arrangements in paying the above expenses.

The above arrangements for procurement of badges applies only to the Master Car Builders' Association, the Master Mechanics' Association badges being procured as formerly.

ROLLER CHAIRS.

The free use of roller chairs has been dispensed with, but arrangements have been made with the Reed and Shill Chair Companies that coupon books will be provided at the following rates: Ten rides, $2.50 each; 20 rides, $5 each.

When the tickets are used, the book covers will be redeemed when presented to the chair companies, with a refund of 50 cents each on the ten-ride book and $1 each on the twenty-ride book.

ENTERTAINMENT.

The following entertainment features have been provided:

Wednesday, June 12.

10:30 a. m.—Orchestra concert on Million-dollar Pier.
3:30 p. m.—Orchestra concert on Million-dollar Pier.
9:00 p. m.—Social gathering and informal dancing, Marlborough-Blenheim hotel.

Thursday, June 13.

10:30 a. m.—Orchestra concert on Million-dollar Pier.
3:30 p. m.—Orchestra concert on Million-dollar Pier.
9:30 p. m.—Informal dancing on Million-dollar Pier.

Friday, June 14.

10:30 a. m.—Orchestra concert on Million-dollar Pier.
3:30 p. m.—Orchestra concert on Million-dollar Pier.
9:00 p. m.—Musical programme.

Saturday, June 15.

10:30 a. m.—Orchestra concert on Million-dollar Pier.
2:00 p. m.—Baseball; parade from Million-dollar Pier to street cars.
3:00 p. m.—Annual baseball game.
No scheduled entertainment in the evening.

Sunday, June 16.

No scheduled entertainment.

Monday, June 17.

10:30 a. m.—Orchestra concert on Million-dollar Pier.
3:30 p. m.—Orchestra concert on Million-dollar Pier.
9:00 p. m.—Informal dancing, Marlborough-Blenheim hotel.

Tuesday, June 18.

10:30 a. m.—Orchestra concert on Million-dollar Pier.
3:00 p. m.—Orchestra concert on Million-dollar Pier.
9:00 p. m.—Informal dancing on Million-dollar Pier.

Western Railway Club.

At the monthly meeting of the Western Railway Club at the Auditorium hotel, Chicago, on Tuesday, April 16, W. A. Pownall, water engineer of the Chicago, Burlington & Quincy, Aurora, Ill., presented a paper on Water Treatment and Boiler Failures. The committee appointed to suggest what changes are necessary in the Master Car Builders' rules of interchange presented a report recommending a reduction of the number of cardable defects.

Transportation Club of New York.

The Transportation Club of New York will hold a travel and vacation exhibition in the New Grand Central Palace May 23-30. A large and varied collection of historic relics, both originals and models, will be shown. In addition, transportation facilities will be displayed by the leading railway, steamship and express companies of the United States.

American Society of Mechanical Engineers.

At the meeting of the American Society of Mechanical Engineers to be held April 30, Rudolph Diesel, D.E., D. Sc., inventor of the Diesel engine will be made an honorary member of the society. Dr. Diesel will give an illustrated address on the development of the Diesel engine.

Canadian Northern Club.

This is the name of a club which has been organized at Toronto by officers and employees of the Canadian Northern Railway, the purpose being to promote both knowledge of railroading and better personal acquaintance and friendship. Meetings are to be held on the first Tuesday of each month. The president is A. J. Hills; secretary, R. Croasdell.

Society of Railway Financial Officers.

The annual meeting of the Society of Railway Financial Officers will be held at the Marlborough-Blenheim hotel, Atlantic City, N. J., on Wednesday, Thursday and Friday, October 23, 24 and 25.

New York Railroad Club.

At the next regular meeting of the New York Railroad Club, to be held April 19, Frank L. Morse will present a paper on The Chief Clerk.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.; annual, May 7-10, Richmond, Va.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.; annual, May 10-11, San Francisco, Cal.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York; next convention, Seattle, Wash.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.; annual, June 18-21, Detroit, Mich.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York. Convention, October 7-11, Chicago.

AMERICAN ELECTRICAL RAILWAY MANUFACTURERS' ASSOC.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next session, May 15, New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Convention, 3d week in Oct., Baltimore, Md.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, Monadnock Block, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOC.—J. W. Taylor, Old Colony building, Chicago. Convention, June 17-19, Atlantic City, N. J.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—M. H. Bray, N. Y. N. H. & H., New Haven, Conn. Convention, July 9, Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Convention, 3d week in January, 1913, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; annual, June 26, 1912, Quebec, Que.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; annual convention, May 22, 1912, Los Angeles, Cal.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Semi-annual, June 11, Atlantic City, N. J.; annual, October 21-25, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; annual, June 24, 1912, New York.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conrad, 75 Church St., New York. Convention, Oct. 7-11, Chicago.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.; annual, May 15, Buffalo, N. Y.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium; convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago. Convention, May 22-25, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, Brown Marx building, Birmingham, Ala. Convention, July 23-26, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Convention, August 15, Chicago.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; annual convention, May 14-17, Pittsburgh, Pa.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Annual convention, June 12-14, Atlantic City, N. J.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Convention, September 10-13, Denver, Col.

NATIONAL RAILWAY APPLIANCES ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

OMAHA RAILWAY CLUB.—H. H. Maulick, Barker Block, Omaha, Neb.; second Wednesday.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Tuesday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.; next meeting, August 13-16, Roanoke, Va.

RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; annual, May 12, 1912, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio. Convention, May 20-22, Buffalo, N. Y.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver Bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. assocs.

RAILWAY TEL. & TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. September 10-13, Buffalo, N. Y.

ST. LOUIS RAILWAY CLUB.—B. W. Fraumenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 18, 1912, Louisville, Ky.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; August, 1912.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago: 1st Monday in month, except July and August, Chicago.

Traffic News.

The Merchants' Association of New York is to establish a traffic bureau, and its manager will be J. C. Lincoln, who for six years was traffic commissioner of the St. Louis Merchants' Exchange. He was formerly in the traffic department of the Missouri Pacific.

F. S. Holbrook, general traffic manager of Wells, Fargo & Company, has issued instructions that free transportation be given donations for the flood sufferers in the Mississippi valley when consigned to regularly authorized charitable institutions or municipal authorities.

Judge Mabee, chairman of the Canadian Railway Commission, is moving for the renewal of the negotiations between Canada and the United States, which were broken off a year ago, looking to the establishment of a joint tribunal to regulate railway traffic between these two countries.

A ten-year contract has been entered into between the Grand Trunk Pacific and the Northern Navigation Company, whereby the railway will run special trains in connection with the boats across the upper lakes, affording a through service between Toronto and Edmonton, via Fort William.

The National Baggage Committee, representing the wholesale mercantile interests of the country, and organized for the purpose of obtaining a readjustment and reduction of present baggage rates, particularly those on sample trunks, will hold a meeting at the LaSalle hotel, Chicago, on April 20.

The Chicago, Rock Island & Pacific, Chicago, Rock Island & Gulf, El Paso & Southwestern and National Railways of Mexico, have agreed to allow frabricating-in-transit privileges at El Paso, Tex., on structural material consigned to points on the National lines under through rates from Missouri river points.

The Canadian Pacific is going to try to promote the farming industry in New Brunswick by running a demonstration farm, and for this purpose has bought 400 acres of land at Fredericton Junction. The agricultural instruction train, which is to be run through New Brunswick this spring, will be sent over the Intercolonial as well as over the lines of the Canadian Pacific.

At a meeting of the Central Passenger Association in Chicago on April 10, a majority of the roads decided to make no rates less than two cents a mile for conventions during the coming summer, including the Republican national convention at Chicago and the Democratic national convention at Baltimore. It is possible that a special meeting may be called at the instance of some lines that favor a reduction in rates.

It is announced in Montgomery, Ala., that the Louisville & Nashville will at once advance passenger rates in that state from 2.5 cents a mile to 3 cents. This action follows the final decree of the federal court enjoining the enforcement of the state law limiting fares to 2.5 cents. Those freight rates which had to be reduced because of the state law will also be restored to the bases which were in force prior to January 1, 1907.

Protests are being made by western shippers that they were given insufficient time for consideration of the proposed changes in the Official Classification in advance of the preliminary meeting in Chicago, and there are prospects that a considerable opposition to some of the details will be presented at the meeting of the committee in New York on April 23. It is claimed that only four days elapsed between the receipt of the docket and the day of the preliminary meeting in Chicago.

The Great Northern will put in effect on May 1 a direct freight and passenger service over its lines from Duluth and Superior to Winnipeg. At the same time the rate on coal from the American head of the lakes to Winnipeg will be reduced fifty cents to $2.50 a ton, placing it on a parity with the Port Arthur and Fort William rate. Rates on the first four classes of freight from Duluth and the Twin Cities will be reduced three cents per 100 lbs. and the fifth class rate two cents per hundred.

On April 10 the Chicago & North Western increased the rates for 25-ride commutation tickets on its Chicago suburban lines an average of ten cents. On April 25 there will also be an increase averaging 30 cents in the rates for 60-ride tickets. No advance will be made in the 10-ride rates. The advances are effective throughout the suburban territory from Chicago to Waukegan, Ill., on the Milwaukee division, Barrington on the Wisconsin division and West Chicago on the Galena division.

The Chicago, Milwaukee & St. Paul has announced the arrangements for new transcontinental passenger train service in connection with the Harriman Lines, which is to go into effect on May 15. There will be two new solid through trains out of Chicago which will not have cars of any other line. Regular fares will be charged. A train for Denver and Portland via the Union Pacific and Oregon Short Line will leave Chicago at 10 a. m., arriving at Denver the second day and Portland the third day, consisting of baggage car and coaches, through chair car and standard sleepers, Chicago to Denver; through standard and tourist sleepers, and a through cafe observation car to Portland. The second train will leave Chicago daily at 10:45 a. m., arriving in San Francisco via the Southern Pacific, and Los Angeles via the San Pedro, Los Angeles & Salt Lake, on the third day. This will have baggage car, tourist sleeping cars and observation sleeping car to San Francisco, and standard and tourist sleepers to Los Angeles.

The Illinois Central on April 14 put in effect new schedules on its Western division lengthening the time of several passenger trains because of increased business and additional cars which had made it difficult to maintain the former schedules. Several similar changes will be made on other lines on May 5. A new train was put into operation between Chicago and Omaha, leaving Chicago at 11:45 p. m., and arriving at Omaha at 3:30 p. m. Returning the train leaves Omaha at 10:55 a. m., arriving at Chicago at 7 a. m. Trains between Fort Dodge, Ia., and Omaha, Neb., and between Dubuque, Ia., and Fort Dodge were abandoned. Under the new schedules the Panama Limited leaving Chicago at 7 p. m., will arrive at New Orleans at 9 p. m., instead of 8:45 p. m., adding 15 minutes to its schedule. Train No. 1, now leaving Chicago at 9:40 a. m., will leave at 9:10 a. m., adding 30 minutes to its schedule. A number of other changes affect less important trains. On May 5 the company will extend its suburban service out of Chicago from Flosmoor, Ill., to Matteson.

"Made in Canada" Exhibition Train.

The Canadian press announces that a "made-in-Canada" exhibition train will leave Toronto in May on a tour from the Atlantic to the Pacific. This moving exhibition, arranged by the Canadian Home Market Association, is intended to show the quality and variety of goods manufactured in Canada, with the idea of extending the home market for them. The train will consist of 12 cars, 10 containing exhibits, and 2 the accompanying staff. The route includes a hundred towns and cities in western Canada. The exhibition will include textiles of all kinds, stoves, pianos, automobiles, beds, springs, mattresses, engines, packing-house products, confectionery, rubber goods, salt, kodaks, farm implements, paints and oils, drugs, cement, furniture, jewelry, watches, silver plate, sheet-metal products, etc. By charging a rental for space the exhibit is made self-sustaining. Each car represents in rents about $3,000. Representatives of each exhibiting firm will take orders.—*Consular Reports.*

Lease of the Boston & Maine to the New Haven.

The principal features of a proposed bill in the Massachusetts legislature to permit the merger of the B. & M. with the N. Y. N. H. & H., are as follows:

(1) The dissolution of the Boston Holding Company and the lease of the Boston & Maine to the New York, New Haven & Hartford for 25 years at 4 per cent. on the outstanding stock. After the tunnel shall have been opened to operation and electrified the rate may be increased to 6 per cent., but no higher rate shall be paid except on the condition that an amount equivalent to the rate above 6 per cent., shall be paid into the state treasury. The lease may be extended over another 25 years upon approval by the Public Service Commission, by which board the original lease must be confirmed. Dissenting Boston & Maine stockholders may petition the supreme judicial court for a determination of the value of their stock by three commissioners.

(2) The construction by the city within three years after work has begun, of a tunnel for electric service between the north and south stations in Boston, city bonds running not over 45 years

and bearing not over 4 per cent. interest to be issued to meet the expense, and the tunnel to be operated by the two roads under contract until July 1, 1937, at a rental of 4½ per cent. upon the net cost, the New Haven to construct and own the tunnel in case the city decides not to build it.

(3) The electrification within five years from the making of the lease of the New Haven-Boston & Maine system within the Metropolitan district.

(4) The elimination of all switching charges as between the two terminals and a flat rate within the electric zone.

(5) Any railway reaching Boston or any Junction railway serving Boston to be entitled to the tunnel and have trackage over the New Haven and Boston & Maine within the electric zone, but without the privilege of local service between two points on said trackage unless the New Haven consents.

(6) This act shall not take effect until accepted both by the city council of Boston, subject to veto of the mayor, and by the directors of the New Haven and the Boston & Maine.

A Station Agent in a New Role.

Determined to secure the co-operation of the farmers in its agricultural work, the Pennsylvania Railroad is forming farmers' clubs on its Williamsport division. A. E. Grove, agent at Elizabethville, has been temporarily relieved in order that he may devote his time to this work. One club has been started at Glen Iron, and another in Mifflinburg. The membership is composed of the very best farmers in the community.

Economical Loading.

For many years it has been the custom of dealers to order carloads of cement in round numbers, such as 100, 150, 200, or 250 barrels. None of these figures, however, represents a carload. There used to be a 30,000-lb. car, but this size no longer is available. Even the 40,000 and 50,000-lb. capacity cars are very scarce and rapidly disappearing. The maximum load which can be placed in any car is 10 per cent. in excess of its marked capacity. There is now an actual deficit in this country of several hundred thousand box cars.

The duty, therefore, of extracting from every car its maximum service is apparent to all. To load cars below capacity, this reduces pro rata the efficiency of the available rolling stock. If a car which will hold 280 bbls. of cement is loaded with 150 bbls., there remains 130 bbls. of wasted room in the car, and to waste room in box cars today is little short of criminal. Every car that is loaded to less than capacity imposes upon some other car an undue burden. An accumulation of such burdens means that from 50 to 100 per cent. more cars are required to do a given amount of work than would be necessary if all the cars were loaded to the limit of their carrying capacity. It is a duty to the public at large, to assist in conserving the existing car supply to the greatest extent possible.

"One car not to exceed 170 bbls." This is the way an order should read when a car ranging from minimum to 170 bbls. is what is wanted. In this case we can use a 40,000, 50,000 or 60,000-lb. car, whichever is easiest obtainable, and load it to the maximum. "One car, 170 to 280 bbls." An order reading in this way will enable us to use either a 60,000, 80,000 or 100,000-lb. capacity car."

Co-operation between shipper and consignee will be of marked benefit to both parties as well as to the railways and other shippers and consignees.—*From The Universal Dealer, published by Universal Portland Cement Company.*

INTERSTATE COMMERCE COMMISSION.

The commission has held in conference ruling that post office inspectors may use passes only while on duty.

The commission has held in conference ruling that the directors and officers of a non-operating lessor railway cannot use interstate passes given them by the lessee railway.

The commission has denied the petition of the Kansas railway commission to grant a rehearing on the salt rate case in which the I. C. C. decided against the state railway commission.

The commission will hold a hearing on May 2 to decide whether the proviso of section 2 of the hours-of-service act applies to trainmen, especially on electric roads. This proviso imposes a maximum limit of consecutive hours of service for all operators, train despatchers and other employees whose duties affect train movements.

The Sioux City Commercial Club has filed with the Interstate Commerce Commission an intervening brief in the case of the Duluth Commercial Club, involving rail and lake-and-rail rates from the East. Sioux City argued that if the present rate adjustment accorded the Twin Cities, based on a differential over Duluth, is a reasonable one, Sioux City is entitled to an approximate basis, and that if Sioux City is not entitled to such a relation the Twin Cities are not. Duluth claims that unless its rates are reduced the Twin Cities should take the local rate over Duluth.

Reduced Fare Tickets and Through Transportation.

In re application and use of mileage, excursion and commutation tickets for through transportation in connection with other lawfully established rates. Opinion by Commissioner Clements:

This is in regard to whether through trips may be made on a combination of two or more reduced fare tickets, such as mileage books, excursion and commutation tickets. Carriers may afford many facilities, accommodations and conveniences to shippers and passengers which they may not be compelled to afford, but they are no more at liberty to unjustly discriminate with respect to such service than with respect to those things which under the law they may be compelled to do. The commission decided that through transportation should be given the passenger on a combination of two or more tickets, provided they were presented to the initial carrier, but that it was not lawful to check a passenger's baggage or grant sleeping car accommodations beyond the point to which the tickets were presented at the point of starting. The initial carrier may therefore issue to a passenger a through ticket for the sum of two or more fares applicable to the several connecting roads composing the through route, or may issue additional tickets at lawful tariff fares which, in connection with the ticket or tickets held by the passenger, will cover the entire journey that the passenger desires to take. It is necessary that definite provision be made for such instances in the established tariff schedules filed with the commission and also in the tariff schedules that contain in the excursion, commutation or mileage fares that are to be used. When tariffs contain such provisions, the combination so authorized may be used in lieu of the regular joint or local fares between the points covered by the combination. (23 I. C. C.)

Mohair Rates Reduced.

National Mohair Growers' Association v. Atchison, Topeka & Santa Fe et al. Opinion by Chairman Prouty.

In this case the complainants ask that mohair shall receive the same rates as those recently given to wool. The commission decided that, since mohair was very similar to wool, and that the only reason that could be advanced for imposing higher rates on it was its somewhat higher value, it should be classified under the western classification as second class in less than carloads, and as fourth class in carloads, with a minimum of 24,000 lbs. for standard 36-ft. car and a proportionate increase for large cars; and that rates found reasonable on wool should not be exceeded in the transportation of mohair. Hitherto mohair has been rated first class, any quantity. The question of reparation has not yet been decided. (23, I. C. C.)

Complaint Dismissed.

Liberty Mills v. Louisville & Nashville et al. Opinion by the commission.

In this case the complainant seeks reparation because the net rates applied on grain products moving out of Nashville in 1908 were the balance of through rates in effect on the date of reshipments and not the balance of the through rates in effect when the grain commenced to move from the several points of origin to Nashville. The commission found that if the transit privilege as published by the defendants had been illegal and therefore void, it was not clear that the commission, in the absence of any showing of discrimination, could order a new and different transit privilege for that period, and also that the complainant paid on its shipments precisely the same rates as did its competitors, so an award of reparation in its favor at this time would result in discrimination against them. The complaint was dismissed. (23, I. C. C.)

REVENUES AND EXPENSES OF RAILWAYS.

EIGHT MONTHS OF FISCAL YEAR, 1912. (SEE ALSO ISSUES OF APRIL 5 AND 12.)

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	143	$717,857	$342,213	$1,140,650	$167,708	$223,198	$29,989	$392,313	$40,953	$854,161	$286,489	—$3,316	$38,896	$244,277	—$96,648
Alabama Great Southern	309	2,115,072	804,456	3,182,656	352,956	701,852	89,091	978,770	76,713	2,197,412	983,244	—3,628	119,458	860,158	45,040
Ann Arbor	292	969,633	378,787	1,437,825	155,342	156,134	34,842	513,412	61,682	921,412	516,413	—10,096	111,884	394,433	49,510
Arizona Eastern	366	973,569	263,994	1,313,115	192,808	100,233	18,245	349,426	50,350	711,062	602,053	1,432	78,508	524,977	162,626
Atlanta & West Point	93	457,137	325,966	862,893	98,903	165,944	38,680	261,397	38,277	603,201	259,692	449	41,512	218,628	—12,271
Atlanta, Birmingham & Atlantic	662	1,648,703	464,077	2,232,274	232,230	365,377	134,747	836,401	87,333	1,656,088	576,186	.....	110,700	465,486	61,847
Atlantic City	167	515,026	858,348	1,445,857	207,580	105,995	19,668	702,402	10,269	1,045,914	399,943	—34,084	56,000	309,859	23,009
Baltimore & Ohio—System	4,433	46,723,870	10,016,702	60,295,120	7,314,058	11,091,961	1,289,317	21,538,719	1,325,550	42,559,605	17,735,515	—423,478	1,964,907	15,347,130	1,231,284
Buffalo & Susquehanna *R. R.*	265	1,112,683	72,545	1,226,492	234,511	229,897	12,127	465,833	51,008	993,376	233,116	.....	20,800	212,316	30,525
Buffalo & Susquehanna *Ry.*	91	337,176	75,329	429,134	52,957	213,783	4,089	193,754	20,287	484,870	—55.736	—365	11,200	—67,301	—19,774
Carolina, Clinchfield & Ohio	238	1,273,842	102,950	1,409,954	90,114	172,666	42,583	281,307	61,281	647,951	762,003	.....	62,000	700,003	252,170
Carolina, Clinchfield & Ohio of S. C.	18	74,393	12,486	89,136	4,561	723	7,722	21,151	3,736	37,893	51,243	.....	4,000	47,243	17,185
Central of Georgia	1,915	6,132,324	2,604,017	9,613,029	1,186,673	1,703,039	270,079	3,218,529	304,175	6,682,495	2,930,534	46,007	400,957	2,575,584	—44,284
Central of New Jersey	672	12,983,662	3,724,831	17,654,365	1,717,032	2,497,193	247,695	5,204,487	324,017	9,990,424	7,663,941	124,119	935,069	6,852,991	891,497
Central Vermont	411	1,747,152	750,235	2,711,780	311,004	438,667	61,535	1,310,835	73,062	2,195,103	516,677	3,599	96,700	423,576	—65,893
Chesapeake & Ohio Lines	2,281	17,709,008	3,707,794	22,383,928	2,655,825	4,392,797	407,767	6,816,916	499,452	14,772,757	7,611,171	14,158	678,067	6,947,262	16,156
Chicago & Alton	1,025	6,523,972	2,836,032	10,109,305	1,375,593	1,975,658	320,936	3,693,735	262,817	7,628,739	2,480,566	—25,962	291,000	2,163,604	—129,594
Chicago & Erie	270	2,733,844	472,438	3,540,120	469,947	674,405	167,352	1,734,432	85,691	3,131,827	408,293	.....	126,088	282,205	—173,530
Chicago, Burlington & Quincy	9,074	39,323,701	14,638,655	59,251,992	6,607,489	10,122,169	1,024,834	19,150,964	1,505,204	38,410,660	20,804,332	—81,336	2,123,025	18,635,971	—476,492
Chicago, Indiana & Southern	359	2,345,084	206,094	2,650,055	368,448	596,205	61,352	982,702	67,504	2,076,211	573,844	1,772	101,099	474,517	132,984
Chicago, Indianapolis & Louisville	617	2,846,758	1,104,587	4,351,093	597,621	620,659	141,989	1,588,422	116,076	3,064,767	1,286,326	.....	185,814	1,100,512	22,001
Chicago, Rock Island & Gulf	477	1,430,737	430,069	1,995,572	223,912	190,172	79,715	676,305	66,012	1,236,116	759,456	—1,815	52,195	705,446	48,958
Chicago, Terre Haute & Southeastern	351	1,145,055	139,356	1,313,856	179,864	210,475	22,715	409,417	60,076	882,547	431,309	—884	69,600	360,825	.....
Cincinnati, New Orleans & Texas Pacific	337	4,860,794	1,217,086	6,399,464	642,880	1,382,613	159,866	1,844,401	148,746	4,178,506	2,220,958	—6,025	174,400	2,040,533	—182,258
Cincinnati Northern	245	706,633	151,512	900,749	166,073	183,410	21,972	367,088	24,593	763,136	137,613	.....	45,691	91,922	—41,509
Cleveland, Cincinnati, Chic. & St. Louis	2,012	13,668,463	5,264,848	20,674,720	2,228,760	3,357,636	608,754	8,310,405	434,791	14,940,346	5,734,374	—22,084	772,512	4,939,778	1,247,114
Colorado & Southern	1,053	4,325,017	968,221	5,678,870	638,110	1,088,667	89,923	1,796,261	183,174	3,796,135	1,882,735	—8,724	211,100	1,662,911	—313,658
Colorado Midland	338	1,005,989	188,059	1,315,999	158,702	238,992	57,236	557,389	43,327	1,055,646	260,353	—1,656	64,000	194,697	41,353
Denver & Rio Grande	2,545	11,802,343	3,417,521	15,911,367	2,090,565	2,847,772	430,165	5,665,158	401,317	11,434,977	4,476,390	—14,753	598,000	3,863,637	—730,820
Detroit, Grand Haven & Milwaukee	191	900,406	434,628	1,537,925	177.580	211,820	54,479	796,868	36,638	1,277,385	260,540	—442	23,039	237,059	32,008
Duluth & Iron Range	200	$4,397,440	$171,388	$4,644,701	$622,126	$419,307	$6,870	$901,331	$93,005	$2,042,639	$2,602,062	$8,297	$224,098	$2,386,261	—$452,881
Duluth, Missabe & Northern	342	4,504,062	296,315	4,867,225	741,205	497,349	14,926	902,389	109,188	2,265,057	2,602,168	35,965	235,817	2,402,316	—2,094,953
Duluth, South Shore & Atlantic	624	1,330,177	643,400	2,083,077	322,945	235,233	76,498	816,136	73,129	1,523,941	559,136	6,447	141,666	423,917	—83,032
El Paso & Southwestern Co	902	4,044,098	641,526	4,939,039	629,970	679,718	97,209	1,380,970	183,614	2,971,481	1,967,558	—15,410	188,885	1,763,263	—23,298
Elgin, Joliet & Eastern	841	6,211,922	31	6,557,669	609,764	1,211,096	33,542	1,958,494	129,111	3,942,007	2,615,662	.....	160,388	2,455,274	964,602
Erie	1,995	24,645,149	6,067,518	33,219,374	3,733,434	5,674,428	748,932	11,339,386	715,497	22,211,677	11,007,697	—95,601	1,227,597	9,684,499	—279,614
Florida East Coast	630	1,191,326	1,024,355	2,542,022	437,636	379,715	57,662	962,315	72,561	1,909,889	632,133	—1,380	124,000	506,753	—60,345
Fort Worth & Denver City	454	2,236,177	1,031,844	3,436,676	703,316	527,674	56,088	1,128,833	111,239	2,127,150	1,309,526	—4,866	93,084	1,211,576	—153,692
Galveston, Harrisburgh & San Antonio	1,338	4,900,846	1,987,241	7,261,868	890,531	1,268,915	253,757	2,766,170	220,086	5,409,459	1,852,409	—38,290	313,109	1,501,110	—440,829
Georgia	307	1,568,490	629,059	2,341,915	197,424	339,652	89,434	992,402	63,208	1,682,120	659,795	.....	21,128	638,667	79,436
Georgia Southern & Florida	395	849,976	577,515	1,651,800	161,877	314,690	57,892	632,870	73,915	1,241,244	410,556	.....	82,619	327,937	1,395
Grand Rapids & Indiana	586	1,944,872	1,212,286	3,420,488	363,396	565,146	90,115	1,454,225	118,160	2,591,042	829,446	—760	184,217	644,469	136,015
Grand Trunk Western	347	2,706,564	1,462,606	4,441,004	428,600	653,234	154,293	1,822,295	109,499	3,167,921	1,273,083	—8,806	253,080	1,011,197	176.118
Great Northern	7,345	32,390,550	9,256,565	44,746,757	4,761,417	5,097,575	730,431	12,199,242	801,031	23,589,696	21,157,061	93,007	2,224,047	19,026,021	3,918,072
Gulf & Ship Island	307	948,346	283,028	1,339,191	178,479	237,592	19,460	385,187	66,468	887,186	452,005	.....	37,106	414,899	—30,635
Gulf, Colorado & Santa Fe	1,597	6,120,937	2,022,758	8,672,378	1,435,062	1,264,704	211,843	3,257,248	259,041	6,427,898	2,244,480	.....	303,719	1,940,761	34,787
Hocking Valley	352	4,125,247	606,949	5,023,472	605,520	791,192	66,662	1,520,235	128,855	3,112,464	1,911,008	.....	301,158	1,609,850	33,242
Houston & Texas Central	789	2,641,101	1,233,040	4,174,444	585,876	693,934	151,748	1,709,162	166,292	3,307,012	867,432	—10,570	180,809	676,053	—468,355
Houston, East & West Texas	191	600,727	222,113	870,887	159,738	90,854	15,075	289,444	29,421	584,532	286,355	.....	34,639	251,716	—57,138
Illinois Central	4,755	24,976,616	9,169,782	39,143,245	5,362,938	9,386,744	954,102	15,693,480	1,032,510	32,429,774	6,713,471	—62,443	1,826,258	3,824,770	—5,637,521
Indiana Harbor Belt	105	.....	.....	1,700,016	203,767	187,896	23,289	774,225	60,768	1,249,945	450,071	22,917	33,437	439,551	253,179
Kansas City Southern	827	4,519,497	1,086,610	6,297,222	648,607	898,006	214,509	2,205,287	244,507	4,210,916	2,086,306	.....	268,755	1,817,551	—461,885
Lake Erie & Western	886	2,918,960	629,314	3,761,220	527,711	646,720	102,354	1,484,516	87,898	2,849,199	912,021	.....	157,297	754,724	124,547
Lake Shore & Michigan Southern	1,775	21,553,416	7,942,093	33,429,388	3,536,703	4,484,380	680,704	10,959,382	585,251	20,246,420	13,182,968	—12,414	1,143,939	12,026,615	4,333,137
Lehigh & Hudson River	97	1,028,506	33,256	1,076,122	121,917	148,279	9,734	366,079	39,539	685,548	390,574	.....	28,000	362,574	29,072
Lehigh Valley	1,449	21,575,591	3,232,495	25,667,256	2,923,009	4,461,674	642,123	8,678,393	543,783	17,248,882	8,418,374	—200,240	932,700	7,285,434	—217,400
Long Island	399	2,167,056	4,674,554	7,145,757	946,803	867,665	106,993	3,256,422	167,096	5,344,979	1,800,778	458,627	434,221	1,825,184	319,427
Louisiana & Arkansas	255	763,223	143,492	944,190	166,336	146,188	18,691	261,209	37,678	630,102	314,088	.....	28,467	285,621	—56,286
Louisiana Western	208	783,093	438.035	1,288,464	158,486	227,251	62,154	429,504	52,998	930,393	358,071	1,304	57,807	301,568	—139,052
Louisville & Nashville	4,705	27,061,483	8,276,314	37,545,728	5,683,327	6,547,624	763,275	11,988,714	713,839	25,696,779	11,848,949	—15,141	1,193,267	10,640,541	882,186

— Indicates Deficits, Losses and Decreases.

REVENUES AND EXPENSES OF RAILWAYS.

EIGHT MONTHS OF FISCAL YEAR, 1912—CONTINUED. (SEE ALSO ISSUES OF APRIL 5 AND 12.)

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Louisville, Henderson & St. Louis	200	532,008	278,594	864,578	186,094	108,114	34,626	288,531	24,073	641,438	223,140	2,669	24,000	201,809	24,551
Maine Central	1,204	4,425,486	2,288,856	7,138,284	1,270,179	912,419	71,655	2,643,481	210,022	5,107,755	2,030,529	21,767	342,477	1,709,819	243,401
Michigan Central	1,817	13,413,243	5,371,049	20,805,409	2,361,155	2,406,668	522,789	8,051,549	353,396	13,695,557	7,109,852	26,626	914,371	6,222,107	2,330,947
Midland Valley	373	644,339	302,737	1,009,444	214,255	159,914	24,240	317,015	50,655	766,079	243,365	743	46,283	197,825	—20,648
Minneapolis & St. Louis	1,585	3,790,294	1,172,918	5,308,003	647,688	788,521	144,680	2,411,086	170,300	4,162,275	1,145,728	—330	229,552	915,846	—492,393
Missouri, Kansas & Texas	1,744	7,688,027	2,989,818	11,356,970	1,412,554	1,619,644	284,050	3,679,834	333,635	7,329,717	4,027,253	—16,931	448,926	3,561,396	—74,927
Missouri, Kansas & Texas of Texas	1,346	4,895,840	2,586,514	7,957,894	1,700,461	767,656	196,358	4,040,034	243,714	6,948,223	1,009,671	—5,939	222,637	781,095	—1,146,502
Missouri Pacific	3,915	11,929,193	3,201,406	16,651,143	2,941,453	3,122,074	474,182	7,642,073	564,544	14,744,326	1,906,817	—29,900	681,194	1,195,723	—63,568
Mobile & Ohio	1,114	6,218,925	989,662	7,671,788	882,671	1,413,615	271,341	2,722,031	253,404	5,543,062	2,128,726	—7,708	201,916	1,919,102	—18,772
Monongahela	65	808,088	18,738	838,573	111,889	63,141	2,725	178,248	15,332	371,335	467,238	.....	21,430	445,808	64,132
Morgan's La. & Tex. R. R. & S. S. Co.	404	2,405,534	855,151	3,461,283	430,680	451,124	109,862	1,375,437	99,916	2,467,019	994,264	—15,845	149,538	828,881	—263,171
Nevada Northern	165	832,980	86,830	943,273	100,352	119,697	3,130	202,739	27,649	453,567	489,706	.....	39,613	450,093	—46,285
New Orleans & North Eastern	196	1,895,966	431,752	2,500,129	233,534	470,164	72,644	931,410	92,436	1,800,188	699,941	—7,483	70,170	622,288	—87,109
New Orleans, Great Northern	282	779,752	233,160	1,092,069	168,917	144,285	20,980	352,805	57,703	744,690	347,379	—604	16,050	330,725	—66,090
New Orleans, Mobile & Chicago	404	975,245	242,107	1,292,663	199,122	139,394	22,511	392,452	63,489	816,968	475,695	—390	35,893	440,192	—43,893
New York, Chicago & St. Louis	562	6,285,679	1,087,651	7,663,732	868,750	813,660	374,218	3,194,190	135,176	5,385,994	2,277,738	—13,179	265,125	1,999,434	226,023
New York Central & Hudson River	3,597	41,082,043	21,655,988	70,109,327	9,157,669	11,235,045	1,472,574	26,292,724	1,785,912	49,943,924	20,165,403	272,209	4,062,222	16,375,390	2,902,519
New York, New Haven & Hartford	2,091	20,702,582	18,091,723	42,695,568	4,406,882	5,059,692	257,311	16,554,928	1,284,675	27,563,488	15,132,080	948,741	2,530,000	13,550,821	797,014
New York, Ontario & Western	566	4,726,298	1,192,645	6,153,584	871,494	1,029,561	79,526	2,359,338	136,727	4,476,646	1,676,938	—7,068	143,333	1,526,537	—170,590
New York, Philadelphia & Norfolk	112	1,727,235	308,481	2,197,415	228,804	390,019	32,250	874,951	98,234	1,624,258	573,157	.....	60,800	512,357	—54,906
New York, Susquehanna & Western	152	1,386,026	401,062	2,007,747	194,637	184,028	14,867	774,562	38,976	1,207,070	800,677	—1,571	142,989	656,117	—15,309
Norfolk & Western	2,104	22,085,481	2,947,727	25,973,397	3,061,538	5,042,232	416,280	7,700,430	501,307	16,721,787	9,251,610	—16,291	930,000	8,305,319	537,822
Norfolk Southern	608	1,337,293	572,578	2,078,815	239,711	256,343	44,599	689,120	104,831	1,334,604	744,211	—3,493	60,000	680,718	11,921
Northern Central	473	6,429,434	1,558,003	8,497,298	884,359	1,817,475	118,647	4,286,344	193,831	7,300,656	1,196,642	4,412	314,370	886,684	109,990
Northern Pacific	6,034	29,377,711	10,475,470	42,651,370	5,092,636	4,636,789	768,350	13,965,685	669,561	25,133,021	17,518,349	272,842	2,183,424	15,607,767	—289,207
Northwestern Pacific	404	959,680	1,257,716	2,393,068	391,965	323,405	26,146	859,472	75,811	1,676,799	716,269	.....	97,365	618,904	103,676
Oregon Short Line	1,762	10,036,188	3,157,989	14,049,853	1,536,728	1,370,356	227,266	3,447,696	285,699	6,867,745	7,182,108	—3,213	948,690	6,230,205	96,135
Oregon-Washington R. R. & Nav. Co.§	1,920	6,900,450	3,387,691	11,012,867	1,411,277	1,147,725	354,342	3,892,519	346,817	7,152,680	3,910,187	17,703	857,740	3,070,150	.....
Pecos & Northern Texas	479	982,236	257,889	1,302,050	179,060	262,803	20,373	444,872	41,122	948,230	353,820	.....	35,048	318,772	23,286
Pennsylvania *Co.*	1,760	26,356,028	5,866,290	35,293,783	4,692,776	6,364,589	597,373	12,427,625	696,665	24,779,028	10,514,755	—14,173	1,521,040	8,979,542	—375,761
Pennsylvania *Railroad*	4,018	77,952,112	22,967,453	108,113,859	12,259,303	21,490,433	1,469,931	40,175,255	2,732,702	78,127,624	29,986,235	—1,057,649	4,764,532	24,164,054	—34,252
Peoria & Eastern	352	1,507,093	485,527	2,147,465	279,397	308,688	42,001	889,728	46,128	1,565,942	581,523	.....	77,803	503,720	—51,454
Pere Marquette	2,330	7,542,127	2,825,110	11,299,160	1,404,131	1,815,393	289,365	5,198,768	265,179	8,972,836	2,326,324	—39,156	453,921	1,833,247	103,871
Philadelphia & Reading	1,014	24,027,011	4,696,860	30,060,048	2,626,145	5,526,976	328,650	9,746,319	530,795	18,758,885	11,301,163	195,730	723,277	10,773,616	399,699
Philadelphia, Baltimore & Washington	713	6,113,127	5,270,009	12,696,152	1,751,933	2,187,486	218,998	5,328,785	301,949	9,789,151	2,907,001	.....	402,723	2,504,278	8,138
Pittsburgh & Lake Erie	215	9,498,529	1,037,782	10,862,038	1,164,180	1,719,208	103,882	2,582,313	189,515	5,759,098	5,102,940	—2,248	239,390	4,861,302	—461,836
Pittsburgh, Cincinnati, Chic. & St. Louis	1,467	18,510,738	5,385,832	26,890,978	3,608,360	4,990,618	541,515	9,710,668	527,868	19,379,029	7,511,949	—7,351	1,009,691	6,494,907	481,785
Pittsburgh, Shawmut & Northern	278	907,731	69,961	992,915	107,128	202,202	8,799	291,803	32,238	642,170	350,745	.....	12,612	338,133	177,074
Port Reading	21	848,143	.....	858,698	66,069	1,393	248	264,666	914	333,290	525,408	28,727	30,400	523,735	—55,352
Richmond, Fredericksburg & Potomac	83	777,361	612,686	1,591,170	161,143	200,058	22,638	598,756	47,351	1,029,946	561,224	.....	8,753	552,471	38,732
Rutland	468	1,222,081	819,127	2,306,266	275,332	351,383	57,794	918,082	52,391	1,654,982	651,284	.....	89,417	561,867	26,429
St. Joseph & Grand Island	319	693,623	287,862	1,075,996	176,875	171,468	39,914	474,136	44,466	906,859	169,137	162	75,275	94,024	—7,047
St. Louis & San Francisco	4,732	17,557,990	7,673,157	27,231,036	3,271,269	3,537,596	732,682	9,629,640	804,246	17,975,433	9,255,603	.....	1,278,135	7,977,468	57,337
St. Louis, Brownsville & Mexico	510	930,497	477,791	1,523,687	327,152	106,003	23,106	532,272	60,135	1,048,668	475,019	.....	43,934	431,085	211,978
St. Louis, Iron Mountain & Southern	3,314	14,971,515	4,168,963	20,509,139	3,428,780	2,936,997	423,765	6,621,004	565,454	13,976,000	6,533,139	—44,925	683,000	5,805,214	611,244
St. Louis Merchants' Bridge Terminal	9	.....	2,531	1,167,706	193,712	80,145	3,516	633,732	40,628	951,733	215,973	.....	46,532	169,441	—102,998
St. Louis, San Francisco & Texas	244	606,602	224,403	886,482	147,112	124,665	23,530	398,107	37,787	731,201	155,281	.....	8,322	146,959	118,581
St. Louis Southwestern	843	4,006,200	923,265	5,198,848	466,669	841,157	226,870	1,279,154	188,338	3,002,188	2,196,660	—8,009	168,350	2,020,301	—90,737
St. Louis Southwestern of Texas	703	2,183,095	719,299	3,108,461	424,645	645,083	98,501	1,198,261	140,018	2,506,508	601,953	—1,728	84,607	515,618	419,163
San Antonio & Aransas Pass	727	2,198,041	822,580	3,200,794	520,413	371,206	45,490	1,143,252	79,026	2,159,387	1,041,407	.....	88,000	953,407	125,135
San Pedro, Los Angeles & Salt Lakes	1,115	3,471,986	1,960,126	5,815,310	951,389	1,336,980	254,577	2,257,249	136,082	4,936,277	879,033	—31,337	197,640	650,056	—243,761
Seaboard Air Line	3,070	9,979,101	3,413,001	14,931,616	2,180,327	2,113,682	479,462	5,407,809	454,646	10,635,926	4,295,690	—9,705	597,000	3,688,985	—416,153
Southern	7,089	27,441,843	11,575,858	42,366,649	5,077,174	6,728,633	1,101,566	14,582,732	1,254,297	28,743,402	13,623,247	42,239	1,627,947	12,037,539	186,719
Southern in Mississippi	281	492,950	269,505	821,272	181,505	72,105	19,430	309,156	31,368	613,564	207,708	.....	39,411	168,297	—20,181
Southern Kansas of Texas	125	703,434	125,265	867,764	137,220	188,069	16,822	331,025	32,452	705,588	162,176	.....	20,900	141,276	—95,976
Southern Pacific Co	6,204	35,997,822	21,048,131	61,237,408	6,955,928	7,471,064	1,390,311	17,661,982	1,561,069	35,040,354	26,196,054	197,202	2,645,611	23,747,645	—868,431
Sunset	59	505,677	128,650	661,194	94,031	22,523	371	237,819	24,762	379,506	281,688	.....	27,118	254,570	—124,188
Syracuse, Binghamton & New York	80	402,072	275,943	771,448	89,142	53,685	22,039	285,430	18,672	468,968	302,480	.....	50,960	251,520	—12,734
Tennessee Central	294	682,969	265,781	1,009,241	180,561	142,194	42,717	382,547	66,645	814,664	194,577	.....	33,666	160,911	—144,480

§ Figures shown here are for the period December 24, 1910, to February 29, 1911.

— Indicates Deficits, Losses and Decreases.

REVENUES AND EXPENSES OF RAILWAYS.

EIGHT MONTHS OF FISCAL YEAR, 1912—CONTINUED. (SEE ALSO ISSUES OF APRIL 5 AND 12.)

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses					Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total, inc. misc.	Maintenance—Way and structures.	Maintenance—Of equipment.	Traffic.	Transportation.	General.	Total.					
Terminal R. R. Ass'n of St. Louis	35	.....	1,951	1,831,747	276,883	191,800	5,607	673,616	44,721	1,192,727	639,020	69,884	221,010	487,894	—120,255
Texas & New Orleans	458	1,710,638	693,185	2,558,988	432,456	579,136	64,552	1,027,442	82,912	2,186,498	372,490	—2,315	118,077	252,098	—196,786
Texas & Pacific	1,885	8,439,664	2,864,525	12,042,254	1,264,195	1,588,059	236,422	5,027,986	363,296	8,479,958	3,562,296	—28,012	521,890	3,012,394	399,171
Toledo & Ohio Central	441	2,999,425	445,553	3,608,709	553,508	504,889	53,458	1,232,942	66,715	2,411,512	1,197,197	—7,140	164,501	1,025,556	—66,476
Toledo, Peoria & Western	248	522,600	307,198	879,575	134,587	190,718	18,649	332,534	27,146	703,634	175,941	.....	38,600	137,341	—12,822
Toledo, St. Louis & Western	451	2,171,836	304,987	2,643,595	308,150	495,634	65,859	974,263	69,149	1,915,055	730,540	.....	117,000	613,540	—73,954
Trinity & Brazos Valley	463	1,540,679	298,436	1,899,842	301,540	239,347	77,918	855,992	92,702	1,567,499	332,343	.....	35,838	296,505	158,773
Union Pacific	3,537	22,542,417	7,104,063	32,650,299	2,884,878	3,980,924	847,352	9,343,102	853,064	17,909,320	14,740,979	—17,432	1,355,917	13,367,630	—2,803,572
Union R. R. of Baltimore	9	823,092	164,618	1,000,673	81,935	.....	6,224	44,780	19,676	152,615	848,058	.....	46,366	801,692	—50,361
Union R. R. of Pennsylvania	31	.....	.....	2,785,324	239,938	644,306	814	1,024,379	28,614	1,938,051	847,273	29,261	53,322	823,312	301,401
Vandalia Railroad	827	4,477,796	1,646,350	6,886,568	924,388	1,311,562	206,765	2,709,075	151,185	5,302,975	1,583,593	.....	225,342	1,358,251	—114,203
Vicksburg, Shreveport & Pacific	171	573,110	334,830	994,775	177,188	173,013	25,274	309,086	37,021	721,582	273,193	1,459	55,371	216,363	—67,745
Virginian	475	2,892,320	179,659	3,160,176	374,281	566,740	40,443	872,745	63,132	1,917,341	1,242,835	41,599	123,800	1,160,634	291,943
Virginia & Southwestern	240	1,016,099	111,584	1,156,174	137,334	232,718	14,573	340,734	30,731	756,090	400,084	.....	38,923	361,161	98,380
Wabash	2,515	12,969,580	4,861,224	19,373,900	2,245,347	3,353,397	633,538	7,961,636	595,288	14,789,206	4,584,694	—12,274	565,008	4,007,412	—1,055,290
Washington Southern	36	255,588	301,813	741,998	90,141	80,759	9,746	290,528	21,966	493,140	248,858	.....	25,959	222,899	—24,034
Western Pacific	935	2,751,063	727,451	3,588,027	670,875	328,399	222,337	1,478,332	181,863	2,881,806	706,221	—28,028	119,299	558,894	.....
Western Ry. of Alabama	133	543,143	335,269	953,991	150,716	176,342	43,105	262,693	48,801	681,657	272,334	133	36,899	235,568	23,641
Western Maryland	543	3,898,212	641,704	4,740,187	550,659	584,641	81,593	1,726,334	108,843	3,052,070	1,688,117	—393	168,000	1,519,724	—150,716
West Jersey & Seashore	356	1,261,944	2,784,723	4,328,008	666,568	750,568	106,482	1,865,907	86,961	3,476,486	851,522	—28,713	200,644	622,165	—206,274
Wheeling & Lake Erie	457	4,397,017	420,902	5,135,899	586,771	911,097	59,270	1,676,221	111,840	3,345,199	1,790,700	19,102	237,562	1,572,240	353,949
Yazoo & Mississippi Valley	1,372	4,564,468	1,798,347	6,861,184	1,270,841	1,005,410	128,918	2,687,945	211,646	5,304,760	1,556,424	—2,186	302,887	1,251,351	—1,048,565

— Indicates Deficits, Losses and Decreases.

Reparation Awarded.

Clyde Coal Co. v. Pennsylvania Company et al. Opinion by Commissioner Meyer:

The southern boundary of the Pittsburgh district is changed to include the complainant's mine at Fredericktown, Pa., and complainant is given a rate of 78 cents per net ton on coal from Fredericktown to Ashtabula Harbor, Ohio. The 78-cent rate from other Pittsburgh district points was ordered by the commission in Boileau v. P. & L. E. R. R. Co., 22 I. C. C., 604.

Rates on Wool Reduced.

Railroad Commission of Oregon v. Oregon Railroad & Navigation Company et al. and National Wool Growers' Association v. Oregon Short Line Railroad Company et al. Opinion by Chairman Prouty:

This is a general investigation of the rates, regulations and practices of certain carriers in the transportation of wool from points between the Mississippi river and the Pacific coast to the Atlantic seaboard. The questions to be settled arose in several cases, and it was decided that they could only be properly disposed of by some proceeding in which a comprehensive view of the entire situation was taken. The questions considered were: Are the present rates just and reasonable, or should they be revised and reduced? If they are to be revised, should graded rates be established, or should the present blanket system, so far as it exists, be retained? Should rates be the same upon both sacks and bales? Should the rating on wool under the western classification be changed? Should transit privileges be allowed, and if so, at what points? What action should be taken under the fourth section applications?

It was shown that the cost of producing wool in the territory west of the Mississippi river has increased considerably and that the prices on wool had diminished. For this reason wool growers were forced to practice economies. Their present complaint of the unreasonableness of rates is the first, although these rates have remained the same since 1896. It was shown that since 1896 the earnings and traffic of the defendants had increased enormously. It follows, therefore, that rates which were reasonable in 1896 would be extravagant now. In 1896 the minimum loading was 15,000 lbs., and today it is 28,000 lbs. This has tended to reduce the cost of transportation. Instances were shown of other commodities which, while they enjoyed lower rates, were more expensive to transport. It was shown that although wool was carried from the Pacific coast terminals to the Atlantic seaboard, a much greater distance than the haul in question, for less than half the rate of the shorter haul, this did not carry much weight, because the lower rate for the longer haul was forced by water competition. This shows that the carriers considered the traffic as remunerative, and if the $1 rate per 100 lbs. is remunerative from Los Angeles, the rate of $2.075 for a haul shorter by from 300 to 850 miles must be very desirable business. The commission decided that from whatever angle this question was approached it was evident that rates of transportation of wool from western to eastern points were excessive and that they should be revised and reduced.

In the question of grading rates, it was decided that although a blanket rate now existed, the proper way of constructing these tariffs was to fix a reasonable rate to the Mississippi river from some point on the eastern edge of the western wool producing area, and then to gradually advance this rate going west until the reflex action of the water competitive rate from the Pacific coast was met, having in mind always that in long distance transportation like this the rate should not increase mile for mile as rapidly as in the shorter distances. Having established rates up to the Mississippi river, through rates to the Atlantic seaboard could be constructed by adding to the western rate a reasonable charge from the Mississippi river to the point of destination.

In regard to rates on sacks and bales, it was decided that a bale rate should be established which would be lower than the sack rate from these western points to the Mississippi river by approximately 15 per cent. of the sacked wool rate, with a minimum of 32,000 lbs. in standard 36-ft. cars, and a proportionately higher minimum for larger cars. A density of 19 lbs. per cu. ft. is required to secure the baled rate.

In regard to whether the rating on wool under the western classification should be changed, it was decided that wool should be classified under the western classification as second class in

less than carloads, and fourth class in carloads with a minimum of 24,000 lbs. in a standard 36-ft. car, and a correspondingly higher minimum in larger cars. This should apply to both sacks and bales. The present classification in official classification territory, is first class, less than carloads, and second class in carloads, with a minimum of 10,000 lbs.

Regarding transit privileges, it was decided that transit is a practice or regulation over which the commission has jurisdiction, and that in a case like this it could require carriers to accord that privilege. Transit should be allowed at intermediate points on a direct line upon payment of 2½ cents per 100 lbs., and upon condition that it applies only to wool originating west of the Mississippi river, which must be kept separate from wool originating at points east of the river.

With regard to the fourth section applications, it was decided that rates on sacked wool from points on the Pacific coast should be not more than 25 cents higher than rates on baled wool, because the cost of baling was about 25 cents per 100 lbs. Proceeding east from the Pacific coast, rates gradually increase until finally a point is reached where the rate, as it increases from the West, meets the rate increasing from the East. At the present time this line of meeting coincides roughly with the eastern boundary of California, Oregon and Washington. In no case is the rate to any intermediate destination point higher than that to the more distant point at the present time. The question of reparation has not yet been decided.

Rates on Glazed Sash and Window Glass Not Excessive.

Massee & Felton Lumber Co. et al. v. Southern Railway et al. Opinion by Commissioner McChord:

Manufacturers of sash, doors and blinds in southeastern Mississippi valley freight association territory here attack the reasonableness of the rate charged them on window glass in carloads shipped from Pittsburgh, and seek to have applied thereon the rate now applicable on glazed sash from Chicago to the same destination. The complainants contend that as the rate on glass from Pittsburgh to Chicago is 18 cents and the rate on glazed sash from Chicago to Atlanta is 38 cents, the western manufacturer can lay down his product in Atlanta at an aggregate transportation charge of 56 cents, which is the same as complainants must pay to transport their glass from Pittsburgh to Atlanta. In the comparisons made by the complainants only the rates on glass into Chicago and glazed sash out are considered, no allowance being made for the open sash into which the glass is placed. Chicago manufacturers obtain their lumber from the Pacific coast, but the southern manufacturers have to pay only a negligible transportation charge for their lumber, as it lies virtually at their door. It was shown that when this cost of lumber transportation was taken in consideration, it cost the southern manufacturer 3.15 cents less per 100 lbs. to procure his raw material than it did the western manufacturer; and it was also shown that the western manufacturer had to pay 41 cents more per 100 lbs. than the southern manufacturer to place his product on the Atlanta market. The complainants' calculations are faulty, because they assume that 100 lbs. of glass is used in 100 lbs. of glazed sash, and no account is taken of lumber, which approximates 50 per cent. of the weight of the completed article. It is evident, therefore, so far as the aggregate relative transportation costs are concerned, that the southern manufacturer is at no disadvantage compared with his western competitor, and no discrimination as between these sections can be found to result from the present rate adjustment.

It was also contended that window glass was unjustly discriminated against in favor of glazed sash. The rate on glazed sash from Chicago to Atlanta is now 38 cents per 100 lbs. This had been reduced from 58 cents by the carriers in order to obtain traffic which they otherwise would have lost on account of the activity of the southern manufacturers. Glazed sash takes a lower rate, either class or commodity, than window glass, and the difference here existing in favor of glazed sash is not unusual. The southern, official and western classifications all rate window glass in carloads fifth class, which from Pittsburgh to Atlanta is 60 cents. This rate was subsequently reduced to 56 cents, and is now lower than a number of articles which take the fifth class rates. The 18-cent rate on glass from Pittsburgh to Chicago is the fifth class rate between those points. To Atlanta the glass rate is six cents lower than the fifth class rate. It was decided, therefore, that the rate on glass from Pittsburgh to Atlanta is not shown to be either unreasonable or unjustly discriminatory. Complaint will be dismissed. (23, I. C. C.)

STATE COMMISSIONS.

The Indiana railway commission has suspended new rates on drain tile which were to have been put into effect by the railways, and also a rule canceling the former practice of paying grain shippers a refund of $2 when the grain doors were supplied by shippers. Hearings will be held on both orders on May 16.

The railway commissioners of Canada have appointed four locomotive inspectors, one each to be stationed at Montreal, Toronto, Winnipeg and Calgary. The intent of the commission in appointing these officers seems to be to provide supervision somewhat like that which is exercised in the United States by the locomotive boiler inspectors.

COURT NEWS.

The full-crew law of Pennsylvania has been sustained by the highest court of the state. This decision was on a case brought by the state against the Pennsylvania Railroad.

In the federal court at Salt Lake, Utah, the Denver & Rio Grande and the San Pedro, Los Angeles & Salt Lake have been convicted of violation of the safety appliance law.

The Supreme Court of the United States has declared unconstitutional the law of Arkansas making a railway liable for double the value of animals killed on the track if the claim of the owner for loss is not settled within 30 days.

In the federal court at Buffalo, N. Y., April 12, the grand jury returned indictments against the American and the Adams express companies on charges of having collected illegal rates for the transportation of merchandise. Shippers were allowed compensation for delivering goods at the station.

The United States Commerce Court has dismissed without prejudice the case of the Lehigh Valley v. U. S. and I. C. C. et al., on the motion of the petitioner. The case was one in which the court was asked to set aside an order of the I. C. C. reducing rates on anthracite coal from Wyoming coal fields to tidewater.

In the United States district court at Atlanta, Ga., on April 11, Judge Newman directed a verdict against the Southern Railway in the suit of the government to impose a penalty for noncompliance with the air brake law. Judge Newman held that where a train is composed entirely of power-braked cars, all of the cars must have their brakes connected up so as to be operated by the engineman.

The Iowa Supreme Court has ordered a rehearing in the Polk county district court of the suit brought by the Agar Packing Company against the Chicago, Rock Island & Pacific, alleging that it had been driven into bankruptcy through discriminations and rebates in favor of eastern packers on shipments from Valley Junction Ia. The court held that the railway company did not make a proper plea to claim the benefit of the statute of limitations.

Suits to compel the Union Pacific and the Chicago, Rock Island & Pacific to build and maintain adequate freight houses and terminals in Kansas City, Kan., in accordance with an order by the Kansas railway commission, have been filed in the Wyandotte county district court. Orders were issued by the court directing the railways either to begin the work by May 4 or to appear at that time to show cause why they should not be compelled to do so.

Judge Cavender, of the United States district court at Leadville, Colo., has overruled the demurrer of the Colorado & Southern to mandamus proceedings instituted by the Colorado railway commission to enforce an order to compel the railway to resume the running of freight and passenger trains on its line between Como, Colo., and Breckenridge, a distance of 21 miles, on the through route from Denver to Leadville. The order was issued last November on complaint of the Breckenridge Chamber of Commerce that the abandonment of service on this line would deprive mines of an outlet and farmers of a market for hay. The railway disputed the authority of the commission.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Frank C. Batchelder, general superintendent of the Baltimore & Ohio, and vice-president of the Baltimore & Ohio-Chicago Terminal Railroad at Chicago, has been elected president of the Baltimore & Ohio-Chicago Terminal, and also has been appointed assistant to the president of the Baltimore & Ohio, with office at Chicago. Mr. Batchelder was born May 27, 1857, at Fall River, Wis., and began railway work in 1874 with the Chicago, Milwaukee & St. Paul. He remained with that road until 1888, having been consecutively agent, operator and train despatcher. He was then for eleven years with the Minneapolis, St. Paul & Sault Ste. Marie, acting first as train despatcher, then as assistant superintendent, and later superintendent. In July, 1899, he went to the Baltimore & Ohio, with which road he has been ever since. He was superintendent of the Northwestern division of the Chicago district at Garrett, Ind., until December, 1901; was then until April 1, 1905, superintendent of the Newark division at Newark, Ohio; and from the latter date until December, 1906, was superintendent of the Chicago division. He was then made general superintendent of the Main Line district at Baltimore. Since the Baltimore & Ohio took over the Chicago Terminal Transfer in April, 1910, and reorganized it as the Baltimore & Ohio-Chicago Terminal Railroad, Mr. Batchelder has been vice-president of the latter road in immediate charge of its operations, at Chicago.

F. C. Batchelder.

A. W. Thompson, general manager of the Baltimore & Ohio and the Baltimore & Ohio Southwestern, at Baltimore, Md., has been elected third vice-president of the Baltimore & Ohio in charge of operation, he also continues as general manager of the B. & O. system, and in addition has been elected third vice-president in charge of operation of the Cincinnati, Hamilton & Dayton. His office remains at Baltimore. Mr. Thompson was born on May 8, 1875, at Erie, Pa., and was graduated from Allegheny College, Meadville, in 1897 as a civil engineer. The following year he began railway work in the engineering department of the Pittsburgh & Lake Erie, and in 1899 was appointed assistant engineer of surveys on the Pittsburgh division of the Baltimore & Ohio. He was made assistant engineer of the Pittsburgh division in 1900, and the following year was appointed engineer of the Cumberland division. In 1902 he returned to Pittsburgh as division engineer, and the following year went back to the Cumberland division as superintendent. He was transferred to Wheeling, W. Va., in 1904 as superintendent of the Wheeling division, and from 1907 to April, 1910, he was chief engineer maintenance of way. In April, 1910, he was promoted to chief engineer of the Baltimore & Ohio system, including the Baltimore & Ohio Southwestern, and remained in this position until December, 1910, when he was made general manager, with office at Baltimore. Mr. Thompson is a member of the American Society of Civil Engineers, and the American Railway Engineering & Maintenance of Way Association.

A. W. Thompson.

George M. Shriver, vice-president of the Baltimore & Ohio, with office at Baltimore, Md., has been elected also vice-president of the Cincinnati, Hamilton & Dayton.

C. H. Schlacks, vice-president of the Denver & Rio Grande and the Western Pacific, at San Francisco, Cal., has resigned as vice-president of the Denver & Rio Grande.

Operating Officers.

G. T. Mowat has been appointed assistant superintendent of terminals of the Texas & Pacific, in charge of the freight station at New Orleans, La.

C. E. Dafoe, trainmaster of the Northern Pacific at Livingston, Mont., has been appointed superintendent of the Midland Empire Railway, with office at Winnipeg, Man.

M. W. Jones, chief clerk to the general manager of the Guayaquil & Quito, has been appointed acting trainmaster, with headquarters at Huigra, Ecuador, and J. C. Dobbie succeeds Mr. Jones.

M. L. Phelps, assistant superintendent of the Colorado Midland at Colorado City, Colo., has been appointed superintendent, with office at Colorado City, succeeding F. B. Miller, resigned, and J. W. Spahr, trainmaster at Cardiff, Colo., succeeds Mr. Phelps.

Fred D. Pendell, whose appointment as superintendent of the Chicago & North Western, with office at North Fond du Lac, Wis., has been announced in these columns, was born October 27, 1861, at Fond du Lac. He attended public and private schools, and in 1879 began railway work with the Chicago & North Western. He was consecutively messenger boy, car clerk, telegraph operator at numerous stations, train despatcher and superintendent's clerk. From 1898 to 1901 he was station agent at Harvard, Ill., and was then for two years agent at Fond du Lac. In March, 1903, he was appointed trainmaster of the Northern Wisconsin division at North Fond du Lac; in August, 1908, was made assistant superintendent of that division, and on April 1 of the present year was appointed superintendent of the same company.

F. D. Pendell.

O. L. Eaton, trainmaster of the Baltimore & Ohio at Connellsville, Pa., has been appointed assistant superintendent, and T. E. Jamison, assistant trainmaster at Connellsville, has been appointed train despatcher of the new division running from Johnstown to Rockwood, both with offices at Somerset.

W. J. Fripp, general superintendent of the New York Central & Hudson River, at Albany, N. Y., has been appointed assistant general manager, with office at Albany. H. L. Ingersoll, assistant to general manager at New York, has been appointed assistant general manager, and will perform such duties as may be assigned to him, with office at New York.

C. W. Hotchkiss, whose election as president of the Illinois Tunnel Company was announced in these columns last week, has resigned as general manager of the Chicago, Indiana & Southern, to become president of the Chicago Utilities Company, a new company organized to take over the Illinois Tunnel Company and its subsidiaries, operating the Chicago freight subway, automatic telephone, warehouse, terminal and dock properties.

H. Rettinghouse, whose appointment as superintendent of the Chicago & North Western has been announced in these columns, was born in Germany July 30, 1861, and was educated in Germany. Mr. Rettinghouse came to the United States in 1882, and began railway work the following year as a rodman on the construction of the St. Paul extension of the Wisconsin Central. The following year he went with the Milwaukee, Lake Shore & Western, now the Chicago & North Western, where he was consecutively rodman, instrument man and assistant engineer in charge of location, construction and maintenance. He was engaged in the general engineering business at Ashland, Wis., for four years from 1893. In 1897 he went with the Chicago & North Western, and, except for the period from February, 1905, to January, 1907, he has been with that road ever since, having been consecutively assistant engineer in charge of construction and maintenance; superintendent of bridges and buildings on the Ashland division, and from January, 1907, to April, 1912, division engineer at Boone, Iowa, in charge of the East Iowa, the West Iowa and the Iowa & Minnesota divisions. From 1905 to 1907 he was division engineer of the Southern division of the Wisconsin Central. On April 1, 1912, Mr. Rettinghouse was promoted to superintendent of the Iowa & Minnesota division of the Chicago & North Western, with office at Mason City, Iowa.

Henry C. Nutt, fourth vice-president of the Northern Pacific and general manager of the lines west of Paradise, Mont., at Tacoma, Wash., has been appointed general manager of the San Pedro, Los Angeles & Salt Lake, with office at Los Angeles, Cal., succeeding R. E. Wells, resigned, effective May 1. Mr. Nutt was born November 12, 1863, at Council Bluffs, Iowa and graduated in 1883 from the Sheffield Scientific School. In August, 1883, he began railway work with the Burlington & Missouri River, and remained with that road and its successor, the Chicago, Burlington & Quincy, until 1906, having been consecutively rodman, trainmaster, assistant superintendent, superintendent and general superintendent. He was made general superintendent of the Michigan Central at Detroit, Mich., in 1906, and the following year was appointed general manager of the Northern Pacific lines west of Trout Creek, Mont. He was elected fourth vice-president and general manager of the latter road, as above noted, in November, 1909, which office he will resign on May 1, to go with the San Pedro, Los Angeles & Salt Lake.

Henry C. Nutt.

Traffic Officers.

L. P. Moore has been appointed immigration agent of the Northern Pacific, with office at Helena, Mont.

A. W. Reese has been appointed commercial agent of the St. Louis Southwestern, with office at Los Angeles, Cal., a new position.

A. L. Jeffries has been appointed passenger traffic agent of the Illinois Traction System, with office at Springfield, Ill., succeeding Oscar L. Hill, resigned.

C. R. Prince has been appointed contracting freight agent of the Illinois Central, with headquarters at Atlanta, Ga., succeeding F. H. Webber, promoted.

M. H. Dorsett has been appointed commercial agent of the Macon, Dublin & Savannah, with office at Jacksonville, Fla., succeeding W. D. Nelson, resigned.

W. J. Keppler has been appointed soliciting freight agent of the Queen & Crescent Route, with headquarters at Chicago, succeeding Henry Hoving, promoted.

G. C. Maxwell has been appointed traveling freight agent of the Chicago, Burlington & Quincy, with office at Cincinnati, Ohio, succeeding W. B. Kelby, deceased.

C. P. Pruitt, traveling freight and passenger agent of the Chicago, Milwaukee & St. Paul, with headquarters at Salt Lake City, Utah, has resigned to engage in other business.

H. R. Lewis has been appointed division freight agent of the Baltimore & Ohio, with office at Baltimore, Md., succeeding Edward S. King, resigned to go into other business.

P. L. Holtz has been appointed traveling freight agent of the Lake Shore & Michigan Southern and the Lake Erie & Western, with office at St. Louis, Mo., succeeding L. D. Gruber, resigned.

H. N. Breckheimer, commercial freight agent of the Wisconsin & Michigan at Menominee, Mich., has been appointed general freight and passenger agent, with office at Menominee, succeeding J. C. Fitzgerald.

G. R. Hackley has been appointed assistant general freight and passenger agent of the Southern Pacific Railroad of Mexico and the Sonora Railway, with office at Mexico City, Mex., succeeding A. Miranda, resigned to accept service with another company.

J. J. Forster, formerly traveling passenger agent of the Canadian Pacific Atlantic Steamship Lines at Seattle, Wash., has been appointed general agent of those lines, with office at Seattle, and with jurisdiction over the states of Oregon, Washington and British Columbia.

B. W. Frauenthal has been appointed general passenger and ticket agent of the Terminal Railroad Association of St. Louis, the St. Louis Merchants Bridge Terminal Railroad Company and the Wiggins Ferry Company, with office at St. Louis, Mo., succeeding V. W. Fisher, deceased.

The Mexico agency of the Rock Island Lines at Mexico City, Mex., has been closed permanently. Correspondence relating to freight matters heretofore addressed to the general agent at Mexico City should in future be sent to R. R. Seeds, traveling freight agent of the Chicago, Rock Island & Gulf at El Paso, Texas.

C. R. L. Wilder, traveling freight agent of the Chicago & Alton and the Toledo, St. Louis & Western at Detroit, Mich., has been appointed commercial agent, with office at Louisville, Ky., succeeding S. C. Clark, southeastern freight agent at Louisville, deceased, and the position of southeastern freight agent has been abolished. J. O. Kobzina succeeds Mr. Wilder.

J. C. Lincoln, formerly assistant freight traffic manager of the Missouri Pacific at Kansas City, Mo., and later traffic commissioner of the St. Louis Merchants Exchange, and who resigned three months ago as president of the Industrial Traffic League of that city, has been appointed manager of the traffic bureau of the Merchants Association of New York City. Effective May 1.

H. B. McClellan, general eastern agent of the Wabash at New York City, having been appointed special traffic representative in eastern territory, with office in New York City, the office of general eastern agent has been abolished; and A. S. Dunbar, eastern passenger agent, has been appointed general agent of the passenger department, with office at New York. L. C. Bostwick has been appointed general agent in the freight department, with headquarters in New York City.

W. A. Bridgman, traveling freight agent of the Wabash at St. Louis, Mo., has been appointed commercial agent, with office at Keokuk, Iowa, succeeding J. H. Cole, resigned, and F. P. Grace succeeds Mr. Bridgman. Walter Bockstahler, contracting freight agent at Detroit, Mich., has been appointed traveling freight agent, with headquarters at Buffalo, N. Y., succeeding W. N. Price, promoted; and Charles J. Sayles, contracting freight agent at Omaha, Neb., has been appointed commercial agent, with office at Hannibal, Mo., succeeding Earle Lind, promoted.

H. O. Foster, agent of the Pacific Coast Steamship Company at Vancouver, B. C., has been appointed city freight and passenger agent, with office at Vancouver. Frank J. Stapleton, contracting freight agent at San Francisco, Cal., has been appointed traveling freight and passenger agent, with office at Spokane, Wash., succeeding Arthur Heathorn, transferred. George P. Whaley succeeds Mr. Stapleton. R. N. Lambert, ticket agent at San Francisco, has been appointed city passenger and ticket agent, with office at Oakland, succeeding A. C. Jenkins, resigned, and F. S. Holzapfel succeeds Mr. Lambert.

William E. Wolfenden, who has been appointed general passenger agent of the Pere Marquette, with office at Detroit, Mich., as has been announced in these columns, was born March 14, 1862, at Port Hope, Ont., and he was educated at the Whitby (Ont.) Collegiate Institute. He began railway work in 1881 as an operator on the Chicago & West Michigan at Woodville and Kent City, Mich., and he was with that road until November, 1900, where he was consecutively agent first at New Richmond, Mich., and then at Benton Harbor, Mich.; traveling passenger agent and general baggage agent. He was general baggage agent for seven years, from 1893 and held that office on the Detroit, Lansing & Northern, as well as on the C. & W. M.. The Pere Marquette having been formed by the consolidation of the Chicago & West Michigan, the Detroit, Grand Rapids & Western and the Flint and Pere Marquette. Mr. Wolfenden was appointed district passenger agent of that road at Grand Rapids, Mich., on November 1, 1900. He was appointed general western passenger agent, with office at Chicago, in February, 1904, which office he held until his present promotion to general passenger agent.

Engineering and Rolling Stock Officers.

C. Houston has been appointed master mechanic of the Nacozari Railroad, with office at Nacozari, Sonora, Mex.

J. Adams has been appointed supervisor of maintenance of way department of the new division of the Baltimore & Ohio, running from Johnstown, Pa., to Rockwood, with office at Somerset.

J. A. Haley has been appointed master mechanic of the Bellingham Bay & British Columbia, with office at Bellingham, Wash., succeeding M. Dailey, resigned to accept service with another company.

F. W. Taylor, master mechanic of the Illinois Central at Mattoon, Ill., has been appointed master mechanic, with office at Waterloo, Iowa, in place of J. A. Bell, who succeeds Mr. Taylor at Mattoon.

J. A. Gibson, formerly master mechanic of the Cleveland, Cincinnati, Chicago & St. Louis at Urbana, Ill., has been appointed combustion engineer of the Illinois Traction System, with headquarters at Urbana.

Arthur Jung, roadmaster of the Middle division of the Atchison, Topeka & Santa Fe at Newton, Kan., has been appointed roadmaster, with headquarters at Ellinwood, Kan., succeeding Joseph Waterhous, transferred; and W. F. Muff, who was roadmaster of the Middle division until the latter part of 1911, has been appointed to that position again, succeeding Mr. Jung.

Nels Osgard, who has been appointed master mechanic of the Great Northern, with office at Superior, Wis., as has been announced in these columns, was born May 26, 1869, in Norway. He received a common school education and began railway work with the St. Paul, Minneapolis & Manitoba, now the Great Northern, in October, 1887, at Minneapolis, Minn. He first worked in the roundhouse, taking care of ashpans and as an engine wiper, and he was subsequently call boy, boiler washer, boilermaker, machinist, blacksmith and fireman. He became an engineer in November, 1896; in April, 1906, was promoted to traveling engineer, and except for about a year when he was a road engineer again, he was a traveling engineer continuously until his present appointment. He was appointed traveling engineer of the Lake district in March, 1909, over which district he now has jurisdiction as master mechanic.

C. W. Cochran, who has been appointed engineer of maintenance of way of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Wabash, Ind., was born in December, 1876, at Winchester, Va., and was educated at the Shenandoah Institute and the Virginia Polytechnic Institute, graduating in 1893 with the degree of B. S. from the former and in 1898 as civil engineer from the latter. He began railway work in June, 1899, with the Cleveland, Cincinnati, Chicago & St. Louis, and, until 1902, he was consecutively rodman, instrument man and assistant engineer on the Chicago division, near Indianapolis. He was then placed in charge of a locating party on Guilford Hill, near Cincinnati, and was resident engineer on construction from 1903 to June, 1907. Frome June to September, 1907, he was engaged in making a topographical survey of the Wood river valley near Alton, Ill., and in the latter month was made assistant engineer of maintenance of way on the Cleveland-Indianapolis division of the C. C. C. & St. L., with office at Galion, Ohio, from which position he has just been promoted to engineer of maintenance of way of the Michigan division at Wabash, Ind. During the winter of 1909 Mr. Cochran was also supervisor of track on the First district of the Cleveland-Indianapolis division.

OBITUARY.

Edward P. Higgins, assistant auditor of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Cincinnati, Ohio, died April 11 at his home near that city. Mr. Higgins was 60 years of age.

J. P. Coleman, for many years connected with the engineering department of the Illinois Central at Chicago, and for the past four or five years with MacArthur Brothers Company, contractors, died at Chicago, on April 13, at the age of 63.

Charles N. Gilmore, superintendent of the Des Moines Valley division of the Chicago, Rock Island & Pacific from 1887 to 1903, died at his home in Des Moines, Iowa, on April 5. Mr. Gilmore was born October 21, 1835, at Stafford, Conn. He began railway work in 1852 as a locomotive fireman on the Bellefontaine Railroad in Ohio, and was with the Illinois Central, first as locomotive fireman and later as conductor, for 20 years. In 1874 he was made superintendent of the Des Moines & Fort Dodge Railroad, and from 1887, when that road was leased by the Rock Island, until the time of his retirement in 1903 he was superintendent of the Rock Island at Des Moines.

Thomas Whyler Greene, chief engineer of the Minneapolis, St. Paul & Sault Ste Marie, died in Minneapolis, Minn., on March 27, at the age of 47. Mr. Greene was born March 25, 1865, at Green Bay, Wis., and was educated in the public schools of that city and Marinette, Wis. In 1883 he began work as an engineer under S. B. Fisher on the construction of the Milwaukee & Western, now a part of the Chicago, Milwaukee & St. Paul, and continued with that company until 1891, when he entered the service of the Minneapolis, St. Paul & Sault Ste. Marie as instrument man. After various promotions he was made principal assistant engineer, and in 1898 was appointed chief engineer of the Soo Line, which position he held at the time of his death. Mr. Greene has directly supervised all the large construction operations of the company during the past 14 years, and has left the impress of his personality and exceptional engineering skill on many important extensions and structures.

Edward J. Richards, formerly chief assistant general passenger agent of the New York Central & Hudson River at New York, died on April 14, at his home in Brooklyn. Mr. Richards was born on February 8, 1843, at Liverpool, Eng., and began railway work on August 1, 1855, as office boy, and was later clerk in the general ticket office of the Hudson River Railroad. From October, 1865, to March, 1873, he was chief clerk in the same office, and from March, 1873, to March, 1880, was chief clerk in the general passenger agent's office of the New York Central & Hudson River. He was appointed assistant general passenger agent in March, 1880, and from January, 1900, to October 1, 1908, he was chief assistant general passenger agent of the same road, since which time he had been performing such duties as were assigned to him by the general passenger agent. Mr. Richards had been in the service of the New York Central & Hudson River and its predecessors for over 50 years; at the time of his death he was a member of the Montauk Club, Brooklyn, and the Transportation Club, New York.

The Ancud to Castro railway, Chile, was opened to public traffic in March last, and the station, warehouses, and other buildings at Ancud have been finished. This line is 62 miles long and cost about $754,000.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Seaboard Air Line is figuring on 26 locomotives.

The Atlantic Coast Line has ordered one four-wheel switching locomotive from the Baldwin Locomotive Works.

The Union Stock Yards Company, Omaha, Neb., has ordered one six-wheel switching locomotive from the Baldwin Locomotive Works.

The Coal & Coke has ordered one eight-wheel passenger locomotive and two consolidation locomotives from the Baldwin Locomotive Works.

The Harriman Lines are preparing an estimate of their requirements for motive power. It is expected that from 150 to 170 locomotives will be needed. This will include the 60 locomotives mentioned in the *Railway Age Gazette* of April 5 and 12.

The Rutland has ordered six 10-wheel locomotives from the American Locomotive Company. The dimensions of the cylinders will be 22½ in. x 26 in.; the diameter of the driving wheels will be 69 in., and the total weight in working order will be 210,000 lbs. These locomotives will be equipped with superheaters.

The Central Railway of Brazil has ordered eight Pacific type locomotives from the American Locomotive Company. The dimensions of the cylinders will be 21½ in. x 28 in.; the diameter of the driving wheels will be 68 in., and the total weight in working order will be 200,000 lbs. These locomotives will be equipped with superheaters.

The Bahia & Minas, Brazil, has ordered three consolidation locomotives and three 10-wheel locomotives from the American Locomotive Company. The consolidation locomotives will have 15-in. x 20-in. cylinders, 38-in. driving wheels, and in working order will weigh 83,000 lbs. The 10-wheel locomotives will have 16-in. x 20-in. cylinders, 45-in. driving wheels, and in working order will weigh 80,000 lbs.

CAR BUILDING.

The Norfolk & Western is in the market for 50 passenger cars.

The Kanawha & Michigan is in the market for 1,000 all-steel, 50-ton, hopper cars.

The Seaboard Air Line is figuring on 1,200 freight cars, 25 caboose cars and 30 passenger cars.

The Bingham & Garfield has ordered 20 general service cars from the Pressed Steel Car Company.

The Barrett Manufacturing Company, New York, is in the market for from 50 to 75, fifty-ton, tank cars.

The American Zinc Company, Hillsboro, Ill., has ordered 50 tank cars from the German American Car Company.

The Kingan Refrigerator Company, Indianapolis, Ind., has ordered 200 refrigerator cars from the American Car & Foundry Company.

The Lehigh Valley has ordered 750 refrigerator cars from the Pullman Company and is rumored to be considering the purchase of passenger equipment.

The Harriman Lines are said to be in the market for 5,700 fifty-ton box cars, 1,000 refrigerator cars, 700 gondola cars, 700 fifty-ton flat cars and 600 fifty-ton work cars. This company has ordered 6 caboose cars from the Pullman Company.

IRON AND STEEL.

The Chicago & North Western is in the market for 2,600 tons of bridge material.

The Erie has ordered 2,300 tons of structural shapes for a coal storage plant at Hammond, Ind.

The Northern Pacific has ordered 5,000 tons of rails from the Pennsylvania Steel Company.

The Harriman Lines are said to have divided an order for 50,000 tons of rails between the Tennessee Coal, Iron & Railroad Company and the Colorado Fuel & Iron Company.

Supply Trade News.

The Cambria Steel Company, Johnstown, Pa., has moved its Chicago office to 1860 McCormick building.

The O'Malley-Beare Valve Company, Chicago, maker of the Multiplate line of valves, will move its general office on May 1 to 333 Railway Exchange.

Edgar Allen & Company, Limited, Chicago, steel manufacturers, announce the removal of their office to larger quarters at 718-722 West Lake street, on April 1.

George E. Fox, formerly purchasing agent of the Guayaquil & Quito, Ecuador, has entered the sales department of the Curtain Supply Company, Chicago, with office in New York.

The railway sales department of John Lucas & Co., Philadelphia, Pa., manufacturers of paints, will move its Chicago office this month from the Old Colony building to 945 Peoples Gas building.

The American Railway Supply Company, New York, has moved its general office from 24 Park place, to its new factory building at 134-136 Charles street. The company has been located at the former address for 22 years.

The Isthmian Canal Commission, Washington, D. C., will receive bids until May 1 on miscellaneous supplies, including cast iron car wheels (circular No. 703); and until April 22 on chain, steel wire, twist drills, hose couplings, hose packing, etc. (circular No. 702).

R. A. Dugan, formerly assistant general manager of the Southern Railway, has gone to the Scullin-Gallagher Iron & Steel Company, St. Louis, Mo., to take charge of the sales department of its Chicago office. The exact location of this office has not yet been determined.

Gunni Jeppesen, for many years designing engineer for the Strauss Bascule Bridge Company, Chicago, has been appointed managing engineer of the company. J. R. Hall, who has been chief draftsman, has been appointed designing engineer, and is succeeded as chief draftsman by A. O. Walker.

The Wyckoff Pipe & Creosoting Company, New York, has received an order for 20,000 sq. yds. of creosoted wood block required for the floor of the new erecting shop at Eddystone Pa., of the Baldwin Locomotive Works, Philadelphia, Pa. This wood block will be 3½ in. deep and will be made of yellow pine.

The Storrs Mica Company, Owego, N. Y., has taken the general agency for the railway trade of the Indestructible hose clamp, made by the Thompson Manufacturing Company, Newark, Ohio. These clamps are used on air brake, air signal, steam and water hose. Sales of this device will be in charge of Charles P. Storrs, manager of the railway department of the Storrs company.

The American Rolling Mill Company, Middletown, Ohio, has erected six tinning stacks at its plant at Zanesville, Ohio, for the manufacture of terne plate, with American ingot iron as a base metal. This plant, which has just begun operations, will have a capacity of from 600 to 1,000 tons a month. The first order was placed by the Irwin Manufacturing Company, Pittsburgh, Pa., for 1,000 cases.

Robert E. Frame, who has been connected with the American Car & Foundry Company, New York, for several years, has resigned to become connected with the Haskell & Barker Car Company, Michigan City, Ind. Mr. Frame was born in Chicago in 1877, was educated in the Chicago schools, and received a thorough training in the practical details of carbuilding in the shops of the Pullman Company, Chicago, with which company he was connected for seven years. For a time he was estimating engineer for the Western Steel Car & Foundry Company, Chicago, and in 1901 was appointed assistant mechanical engineer of the American Car & Foundry Company, with office at St. Louis, Mo., later being appointed mechanical superintendent at St. Louis. In November, 1909, he was transferred to Chicago in the office of first vice-president and general manager.

J. W. Mack, secretary and treasurer of the Nathan Manufacturing Company, New York, died April 11, following an opera-

tion. Mr. Mack had been secretary and treasurer of the Nathan company ever since its organization in 1883, when it succeeded Nathan & Dreyfus. Mr. Mack was the youngest son of an eminent German physician, Dr. Wolfgang Mack, and was born at Fürth, Germany, 67 years ago. He was educated at the universities at Heidelberg and Stuttgart, and came over to this country in his early twenties. For 12 years Mr. Mack was a school commissioner for the city of New York, and was also for some years vice-president of the Society for the Prevention of Cruelty to Children. He was a member of the New York chamber of commerce, a past president of the Harmonie Club, and as a member of the Armstrong Society took great interest in advancing the education of the negro race.

List of Exhibitors, 1912 June Convention.

Following is a list of the exhibitors who have already secured space for the exhibit of the Railway Supply Manufacturers' Association, to be held at Atlantic City, N. J., in connection with the conventions of the American Railway Master Mechanics' Association and the Master Car Builders' Association in June:

Acme Supply Company, Chicago.
Ajax Manufacturing Company, Cleveland, Ohio.
American Abrasive Metals Company, New York.
American Arch Company, New York.
American Balance Valve Company, Jersey Shore, Pa.
American Brake Company, St. Louis, Mo.
American Brake Shoe & Foundry Company, Mahwah, N. J.
American Brass Company, Ansonia, Conn.
American Car & Foundry Company, Chicago.
American Locomotive Company, New York.
American Nut & Bolt Fastener Company, Pittsburgh, Pa.
American Roll Gold Leaf Company, Providence, R. I.
American Steel Foundries, Chicago.
American Tool Works, Cincinnati, Ohio.
American Vanadium Company, Pittsburgh, Pa.
American Mason Safety Tread Company, New York.
Anchor Packing Company, Philadelphia, Pa.
Automatic Ventilator Company, New York.

Barco Brass & Joint Company, Chicago.
Berry Brothers, Ltd., Detroit, Mich.
Best Manufacturing Company, Pittsburgh, Pa.
Best, W. N., New York.
Bethlehem Steel Company, South Bethlehem, Pa.
Bettendorf Axle Company, Bettendorf, Iowa.
Blackall, Robert H., Pittsburgh, Pa.
Boss Nut Company, Chicago.
Bowser & Company, Inc., S. F., Fort Wayne, Ind.
Brunix Manufacturing Company, Philadelphia, Pa.
Buckeye Steel Castings Company, Columbus, Ohio.
Buffalo Brake Beam Company, New York.
Bullard Machine Tool Company, Bridgeport, Conn.
Buyers Index Company, Chicago.
Brown Automatic Connector Company, Chattanooga, Tenn.

Cambria Steel Company, Johnstown, Pa.
Camel Company, Chicago.
Carborundum Company, Niagara Falls, N. Y.
Carey Company, Philip, Cincinnati, Ohio.
Carnegie Steel Company, Pittsburgh, Pa.
Carter Iron Company, Pittsburgh, Pa.
Chase & Company, L. C., Boston, Mass.
Chicago Car Door Company, Chicago.
Chicago Car Heating Company, Chicago.
Chicago Pneumatic Tool Company, Chicago.
Chicago Railway Equipment Company, Chicago.
Chicago Steel Car Company, Chicago.
Chicago Varnish Company, Chicago.
Chisholm & Moore Manufacturing Company, Cleveland, Ohio.
Coe Manufacturing Company, W. H., Providence, R. I.
Collins Metallic Packing Company, Philadelphia, Pa.
Colonial Steel Company, Pittsburgh, Pa.
Commonwealth Steel Company, St. Louis, Mo.
Consolidated Car Heating Company, New York.
Crane Company, Chicago.
Crosby Steam Gage & Valve Company, Boston, Mass.
Crucible Steel Company of America, Pittsburgh, Pa.
Curtain Supply Company, Chicago, Ill.

Dahlstrom Metallic Door Company, Jamestown, N. Y.
Davis-Bournonville Company, New York.
Davis Solid-Truss Brake Beam Company, Wilmington, Del.
Dearborn Drug & Chemical Works, New York.
Detroit Lubricator Company, Detroit, Mich.
Dickinson, Inc., Paul, Chicago.
Dixon Crucible Company, Jos., Jersey City, N. J.
Dressel Railway Lamp Works, New York.
Duff Manufacturing Company, Pittsburgh, Pa.
Durbin Automatic Train Pipe Connector Company, St. Louis, Mo.
Damascus Brake Beam Company, Cleveland, Ohio.
Deforest Sheet & Tin Plate Company, Niles, Ohio.
Duntley Keller Pneumatic Tool Company, Chicago.

Eagle Glass & Manufacturing Company, Wellsburg, W. Va.
Economy Car Heating Company, New York.
Edison Storage Battery Company, Orange, N. J.
Edwards Company, O. M., Syracuse, N. Y.
Electric Controller & Manufacturing Company, New York.
Electric Storage Battery Company, Philadelphia, Pa.
Emery Pneumatic Lubricator Company, St. Louis, Mo.

Fairbanks Company, New York.
Farlow Draft Gear Company, Baltimore, Md.
Flannery Bolt Company, Pittsburgh, Pa.
Forged Steel Wheel Company, Pittsburgh, Pa.
Forsyth Brothers Company, Chicago.
Foster Company, Walter H., New York.
Franklin Manufacturing Company, Franklin, Pa.
Franklin Railway Supply Company, New York.
Frost Railway Supply Company, Detroit, Mich.

Galena Signal Oil Company, Franklin, Pa.
Garlock Packing Company, Palmyra, N. Y.
General Electric Company, Schenectady, N. Y.
General Railway Supply Company, Chicago.
Gold Car Heating & Lighting Company, New York.
Goldschmidt Thermit Company, New York.
Gould Coupler Company, New York.
Greene, Tweed & Company, New York.
Greenlaw Manufacturing Company, Boston, Mass.
Griffin Wheel Company, Chicago.
Grinden Art Metal Company, Brooklyn, N. Y.
Grip Nut Company, Chicago.
Gould & Eberhardt, Newark, N. J.

Halcomb Steel Company, Philadelphia, Pa.
Hale & Kilburn Company, Philadelphia, Pa.
Hammett, H. G., Troy, N. Y.
Harrington, Son & Company, Inc., Edwin, Philadelphia, Pa.
Hewitt, H. H., New York.
Heywood Brothers & Wakefield Company, Wakefield, Mass.
Higley Machine Company, New York.
Hobart-Allfree Company, Chicago.
Home Rubber Company, Trenton, N. J.
Hubbard & Company, Pittsburgh, Pa.
Hunt Company, C. W., West New Brighton, N. Y.
Hunt-Spiller Manufacturing Corporation, Boston, Mass.

Illinois Steel Company, Chicago.
Independent Pneumatic Tool Company, Chicago.
International Oxygen Company, New York.

Jacobs-Shupert U. S. Fire Box Company, New York.
Jenkins Brothers, New York.
Jessop & Sons, Inc., Wm., New York.
Johns-Manville Company, H. W., New York.
Joliet Railway Supply Company, Chicago.
Jones & Laughlin Steel Company, Pittsburgh, Pa.
Joyce-Cridland Company, Dayton, Ohio.

Keystone Drop Forge Works, Chester, Pa.
Keystone Lubricating Company, Philadelphia, Pa.
Keyoke Railway Equipment Company, Chicago.
Knight Pneumatic Sander Company, Huntington, Ind.

Landis Machine Company, Waynesboro, Pa.
Lehon Company, Chicago.
Locomotive Improvement Company, Clinton, Iowa.
Locomotive Superheater Company, New York.
Lucus Machine Tool Company, Cleveland, Ohio.
Lunkenheimer Company, Cincinnati, Ohio.

Main Belting Company, Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., New York.
Manufacturers' Exhibit of Railway Supplies, Chicago.
Massachusetts Mohair Plush Company, Boston, Mass.
Matthews-Davis Tool Company, St. Louis, Mo.
Midvale Steel Company, New York.
Mid-Western Car Supply Company, Chicago.
Milburn Company, Alexander, Baltimore, Md.
Moran Flexible Steam Joint Company, Louisville, Ky.
Mudge & Company, Burton W., Chicago.

McConway & Torley Company, Pittsburgh, Pa.
McCord & Company, Chicago.
McCord Manufacturing Company, Chicago.
McGraw Publishing Company, New York.

Nathan Manufacturing Company, New York.
National Lock Washer Company, Newark, N. J.
National Malleable Castings Company, Cleveland, Ohio.
National Tube Company, Pittsburgh, Pa.
Nazel Engineering & Machine Works, Philadelphia, Pa.
Newhall Engineering Company, Geo. M., Philadelphia, Pa.
Newton Machine Tool Works, Inc., Philadelphia, Pa.
New York Air Brake Company, New York.
Nickel-Chrome Chilled Car Wheel Company, Pittsburgh, Pa.
Niles-Bement-Pond Company, New York.
Norton, Inc., A. O., Boston, Mass.
Norton Company, Worcester, Mass.

Pantasote Company, New York.
Parkesburg Iron Company, Parkesburg, Pa.
Parsons Engineering Company, Wilmington, Del.
Pease Company, C. F., Chicago.
Pennsylvania Flexible Metallic Tubing Company, New York.
Pilliod Company, Swanton, Ohio.
Pittsburgh Equipment Company, Pittsburgh, Pa.
Pneumatic Jack Company, Louisville, Ky.
Pocket List of Railroad Officials, New York.
Pressed Steel Car Company, New York.
Pyle National Electric Headlight Company, Chicago.
Pyrene Manufacturing Company, New York.

Railway Age Gazette, New York.
Railway & Engineering Review, Chicago.
Railway List Company, Chicago.
Railway Materials Company, Chicago.
Railway Utility Company, Chicago.
Reliance Electric & Engineering Company, Cleveland, Ohio.
Remy Electric Company, Anderson, Ind.
Restein Company, Clement, Philadelphia, Pa.
Robinson Coupler Company, Washington, D. C.
Rochester Germicide Company, Rochester, N. Y.
Rubberset Company, Newark, N. J.

Safety Car Heating & Lighting Company, New York.
Scarritt-Comstock Furniture Company, St. Louis, Mo.
Scullin-Gallagher Iron & Steel Company, St. Louis, Mo.
Sellers & Company, Inc., Wm., Philadelphia, Pa.
Shelby Steel Tube Company, Pittsburgh, Pa.

Simplex Railway Appliance Company, Chicago.
Sprague Electric Works of General Electric Company, New York.
Standard Coupler Company, New York.
Standard Roller Bearing Company, Philadelphia, Pa.
Standard Steel Car Company, Pittsburgh, Pa.
Storrs Mica Company, Owego, N. Y.
Street, Clement F., Schenectady, N. Y.
Swedish Iron & Steel Corporation, New York.
Symington Company, T. H., Baltimore, Md.
Sinclair Company, Angus, New York.

Tabor Manufacturing Company, Philadelphia, Pa.
Templeton, Kenly & Company, Ltd., Chicago.
Topping Brothers, New York.
Tyler Company, W. S., Cleveland, Ohio.

Union Draft Gear Company, Chicago.
Union Spring & Manufacturing Company, Pittsburgh, Pa.
U. S. Light & Heating Company, Niagara Falls, N. Y.
U. S. Metal & Manufacturing Company, New York.
U. S. Metallic Packing Company, Philadelphia, Pa.

Valentine Company, New York.
Van Beuren, Walter B., New York.
Van Dorn & Dutton Company, Cleveland, Ohio.
Virginia Equipment Company, Toledo, Ohio.
Vixen Tool Company, Philadelphia, Pa.

Ward Equipment Company, New York.
Warner & Swasey Company ,Cleveland, Ohio.
Watson-Stillman Company, New York.
Welsbach Company, Gloucester, N. J.
West Disinfecting Company, New York.
Western Railway Equipment Company, St. Louis, Mo.
Westinghouse Air Brake Company, East Pittsburgh, Pa.
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.
Westinghouse Machine Company, East Pittsburgh, Pa.
Wheel Truing Brake Shoe Company, Detroit, Mich.
Williams Company, Inc., G. H., Cleveland, Ohio.
Wilmarth & Morman Company, Grand Rapids, Mich.
Wilson Remover Company, New York.
Wood, Guilford S., Chicago.

Yale & Towne Manufacturing Company, New York.

Zug Iron & Steel Company, Pittsburgh, Pa.

Track Exhibitors.

McKeen Motor Car Company, Omaha, Neb.

Standard Truck Company, Chicago.

TRADE PUBLICATIONS.

Central Vermont.—This company has just issued an attractive Seashore booklet describing the eastern resorts reached by its line.

Wheel Presses.—The Watson-Stillman Company, New York, has published catalog No. 85 of its hydro-pneumatic wheel presses. The catalog gives illustrations and detailed descriptions.

Door Fixtures.—The Railway Utility Company, Chicago, has issued a new booklet describing the company's line of automatic locks for freight car doors, double roller door hangers, and other fixtures.

Denver & Rio Grande.—This company has just issued a handsome folder in the interest of those who will attend the annual reunion of the Elks at Portland, Ore., July 8-13. The folder is well illustrated with views along the company's lines as well as many scenes in and about Portland, and contains a program of the week's entertainment.

Motors.—The General Electric Company, Schenectady, N. Y., has devoted bulletin No. 4915 to its type CVC, direct current motors of the commutating pole design. These motors embody certain improvements over those described in the company's previous bulletin on this subject. The bulletin amply illustrates and describes these motors and includes rating tables.

Track Motor Cars.—The Chicago Pneumatic Tool Company, Chicago, has issued catalog No. 40, devoted to the description and illustration of several types of Rockford railway motor cars. The catalog contains specifications of the different types of car and a large number of letters from railway men describing the service they have given. This company has also issued circulars describing individual types of motor cars, including the Rockford runabout for inspection and signal service and the Rockford spike-driving car.

Good progress is being made with the deviation of the Great Western line between Emu Plains, New South Wales, and Blaxland. The embankment at Emu Plains, consisting of a fill of 100 cu. yds., is half finished, and the abutments and piers over Knapsack Gulley are well advanced. The embankments and culverts are being constructed for double track throughout.

Railway Construction.

New Incorporations, Surveys, Etc.

Alaska Midland.—An officer writes that this compauy plans to build from Haines, through the western part of Yukon territory to Fairbanks, Alaska, but it is undecided when the work will be carried out. John Rosene, president, Seattle, Wash.

Atlanta & Macon (Electric).—Incorporation will be asked for in Georgia by a company, under this name, with $100,000 capital to build from Atlanta, Ga., southeast to Macon, about 80 miles. K. Cowan, Chicago; C. G. Young, New York; H. N. Randolph; H. M. Scott, and R. S. Parker, all of Atlanta, are interested.

Baltimore & Ohio.—An officer writes that bids have been received for making improvements on the line between Harper's Ferry, W. Va., and Brunswick, Md. F. L. Stuart, chief engineer, Baltimore, Md.

Canada & Gulf Terminal.—An officer writes that contracts are to be let at once to build extensions. The company now operates a line from Ste. Flavie, Que., northeast following the shore of the St. Lawrence river to Matane, 36 miles. The plans call for extensions as follows: From Matane east to Gaspe Basin, about 160 miles, with a short branch from this line from a point west of Gaspe Basin east to Douglastown, about 20 miles; from Ste. Flavie southwest to St. Eleuthere, 90 miles, and a branch from Ste. Flavie west to Rimouski, 20 miles. The company expects to develop a traffic in lumber, ore and fish. M. J. O'Brien, president, Montreal, and R. Dupont, traffic manager, Matane.

Carolina, Clinchfield & Ohio.—See this company in Railway Financial News.

Central Railroad of New Jersey.—An officer writes that contracts have been let for carrying out improvements on the line between Jersey City, N. J., and Newark. J. O. Osgood, chief engineer, New York.

Clinton & Oklahoma Western.—An officer writes that this company expects to finish work about July 1 on the extension from Butler, Okla., west up the Washita valley to the new town of Strong City, 30 miles. J. W. Maney, president, and G. V. McClure, chief engineer, Oklahoma City. (March 1, p. 408.)

Cumberland Valley & Interstate (Electric).—An officer writes that the proposed route is from Gallatin, Tenn., east and northeast to Hartsville, Lafayette and Red Springs. The prospects of building the line are good, but it has not yet been decided when bids will be asked for the work. There will be two steel bridges, about 200 ft. long. W. G. Schamberger, president, and W. H. Spradlin, chief engineer, Gallatin.

Hudson Bay Railway.—Bids are to be asked for in the near future by the Dominion government to build a second-section of about 100 miles. A contract has already been let to J. D. McArthur, Winnipeg, Man., for the first 185 miles from Le Pas, Keewatin, northeast to Thicket Portage. (Aug. 18, p. 356.)

Long Island.—The report of this company for the year ended December 31, 1911, shows that the work on the Atlantic avenue terminal consisted of finishing a small amount of excavation work in the depressed freight yards, and the Bay Ridge improvements consisted of finishing three bridges, and the new section of work between New Lots and Atlantic avenue. Work on the tunnel between Atlantic avenue and Central avenue will probably be started in 1912. The work in connection with the new terminal at Jamaica and elimination of grade crossings through Richmond Hill and Jamaica has been continued during the year, several bridges were completed, and a large amount of excavation was moved from the Wading river branch and put in permanent position so that yard-tracks could be laid, and the foundation for the station and office building completed. No work has been carried out on the main line improvement between Woodside and Winfield, except to secure property and to clear the right of way. A small amount of second-track was added on the Oyster Bay branch, also a small extension was completed to the second-track on the Wading river branch between Hicksville and Cold Spring, and land has been secured for second-track to be laid between Oakdale and Patchogue. Second-track will be extended to Great Neck, and the line through Port Washington to White-

stone Landing will probably be electrified during 1912. Work on the cutoff of the Wading river branch has been continued between Syosset and Cold Spring and Huntington. This improvement will shorten the line 1,300 ft., abolish grade crossings, reduce grades, eliminate sharp curves between Syosset and Huntington, and in addition will furnish the material necessary for the Jamaica improvements. At Floral Park a double-track connection with the Hempstead branch was put in, and a new bridge was built over Carman's river on the Montauk division. Land has been bought at 12 different points for freight yards, passenger stations, etc. Work has been continued during the year on the elimination of grade crossings at many points, and nine of these are now being removed. Outside of Greater New York, grade crossings will be removed during 1912 at several points, and in Greater New York the crossings have been ordered removed on the Montauk division at Bushwick Junction and on the main line between Hollis and Queens.

Louisiana Purchase.—The North & South Railway Association has been incorporated at Phoenix, Ariz., with $1,000,000 capital, and with principal office at Hermann, Gasconade county, Mo. The company proposes to build from the Gulf of Mexico to the Dominion of Canada, with branches to Omaha, Neb., Duluth, Minn., and other points. The name proposed for the main line is Louisiana Purchase Railroad. J. M. Wilson, president; A. I. Beall, secretary. J. Tonge, F. Berkley, R. E. Francis and E. Klein, are directors.

Meridian & Memphis.—According to press reports, this company is asking for bids to grade about 30 miles from Meridian, Miss., northwest to Union. The company is in the market for 30 miles of 60-lb. relaying rails. S. A. Neville, president, Meridian.

National Railways of Mexico.—An officer writes that a contract has been given to the Cia. Constructura de Ferrocarriles S. A., Mexico City, to build from Tampico, Mex., south to Vera Cruz, about 250 miles. One route has been surveyed for the line north of Tampico to Matamoros, about 250 miles, and another route has been reconnoitered. It has not yet been definitely decided which route will be followed. Surveys are also being made for the connecting line from a point near Tamos south to Honey, or to Beristain, on the Hidalgo & Northeastern division. Three surveys will be made before the route is selected for this connecting line, and no contracts will be let until much of the other work is carried out. J. M. Reid, chief engineer, Mexico City. (March 29, p. 780.)

New York Subways.—Bids have been asked for by the New York Public Service Commission, First district, for building the section of the Lexington avenue subway under the Harlem river. This section begins a little north of 129th street, and the plans call for the construction of a tunnel under the river into the borough of the Bronx as far as 135th street, where the subway will divide into two branches, along Jerome avenue and Woodlawn road, and through 138th street, the Southern Boulevard and Westchester avenue to Pelham Bay Park. The section for which bids are asked is to have four tracks.

Sandy River & Rangeley Lakes.—This company will make improvements, including fills at various places now occupied by trestles, and in addition will build a four-mile branch from a point near East Madrid, Me., to new lumber mills of the Barnjum Timber Land Company in Mount Abram township. T. L. Dunn, chief engineer, Portland, Me.

Southern Pacific of Mexico.—An officer writes that this company has extended its line to Tepic, Mex., which is about 1,000 miles south of the international boundary line, and has also built from Guadalajara north about 62 miles. It is the intention to extend this line north about two miles to facilitate the handling of traffic to and from the Hostotipaquillo mining district. On the completion of this line there will be about 100 miles yet to be built to connect the west coast line with the National Railways of Mexico near Guadalajara, to provide a through all-rail route from Nogales, Ariz., south to the City of Mexico. Epes Randolph, president, Tucson, Ariz.

Three Forks, Helena & Madison Valley.—An officer writes that a contract has been given to the Montana Construction & Irrigation Company, E. A. Tennis, president, Three Forks, Mont., and sub-contracts have been given to A. B. Bennett and to others for grading work on this line. The plans call for building from Helena, Mont., south via Radersburg, Three Forks, and Ennis to Yellowstone Park, about 150 miles. The work calls for the handling of about 20,000 cu. yds. a mile. There will be one 500-ft. trestle. The line is being built to carry ore and farm products. A. D. Atkins, president, and B. L. Allen, chief engineer, Three Forks. (April 5, p. 825.)

RAILWAY STRUCTURES.

Des Moines, Ia.—Preliminary work has been started on a new freight house and office building to be erected by the Chicago, Burlington & Quincy. The building will be two stories high and two blocks long. Together with trackage, it is estimated that the cost will approximate $250,000.

Galesburg, Ill.—The Chicago, Burlington & Quincy has awarded the contract for a new station to replace that destroyed by fire last year, to C. A. Moses of LaGrange, Ill. The estimated cost of the structure is $225,000. The building will be of brick, with Bedford and granite trimmings, reinforced concrete shed, tile floors and tile roof and fireproof construction throughout. The first floor, which will be devoted to station purposes, will be finished in oak or mahogany, and the second floor, which will contain the division offices, will be finished in oak. A contract has also been let to the Marquette Construction Company, Chicago, for building a subway to carry Seminary and South streets under the railway tracks at an estimated cost of $50,000. The company is beginning work on a reinforced concrete addition to its tie-treating plant, including a power plant and a 7-ft. smoke stack 135 ft. high. The work will be done by company forces, except the stack, which will be contracted for.

Kansas City, Mo.—The Kansas City Terminal Railway has awarded a contract to O'Hagan & Lake, Aurora, Ill, covering concrete work in connection with the union station between Broadway and State Line, including several subways, and amounting to about $200,000.

Laurel, Miss..—The New Orleans & Northeastern is planning to begin work at once on the erection of a new passenger station to cost about $100,000.

Pittsfield, Mass.—According to press reports, the Boston & Albany will put up a new station at Pittsfield. The structure is to be built on the site of the present station.

Portland, Me.—The Portland Terminal Company (Maine Central) announces plans for extensive changes. The freight business will be concentrated in a large new yard at Thompson's Point. A new station will be built at Brighton avenue, and more than six miles of new double track laid. The changes will involve crossing several Portland streets. The total cost is estimated at $2,000,000.

Somerset, Pa.—Improvements are being carried out by the Baltimore & Ohio on the line between Johnstown, Pa., and Rockwood. Five heavy steel bridges will be built this spring at the following points: At Holsopple, at Skew, at Pine Creek, at Hog Back tunnel, and at Stony Creek.

Tampa, Fla.—Bids are wanted May 7, by the Board of Commissioners of Public Works, Tampa, for putting up a bridge at Lafayette street over the Hillsboro river at Tampa. The work includes two reinforced concrete arch spans having a clearance of 80 ft., with a Scherzer rolling lift draw in the center, also concrete retaining walls for the approaches. The structure is to carry two tracks for street railways, and with approaches will have a total length of about 1,000 ft.

The last stages of the work in connection with the railway extension from Cooma New South Wales, to Nimityvelle, are almost completed, and the line is expected to be open to traffic very shortly. The Victoria Railway Department, Australia, has adopted a new type of locomotive whistle which, while possessing a full mellow sound, can be heard sufficiently far away to give warning of the approach of the train. All of the locomotives on the surburban lines have been fitted with these whistles, and the other locomotives will soon be similarly equipped.

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Canadian Northern.—See Quebec & Lake St. John.

Carolina, Clinchfield & Ohio.—The proposed line from Dante, Va., to Elkhorn, Ky., 40 miles, to a connection with the Louisville & Nashville, the Chesapeake & Ohio and the Baltimore & Ohio, is expected to cost about $5,000,000 and will probably be financed through a sale of 5-year notes issued by the C. C. & O. and secured on the new line. This line, which will have a maximum grade of 1 per cent. and a good alinement, will run almost entirely through the coal properties of the company and will permit of new mine development.

Central of Georgia.—Treasurer Askew has notified holders of second and third income bonds that interest at the rate of 2.179 per cent. on each second income bond, and at the rate of 5 per cent. on each third income bond, has been declared to be payable for the fiscal year ended June 30, 1908, and is being paid at the Guaranty Trust Co., New York, or the Citizens & Southern Bank, Savannah, Ga. This is the remainder of the full 5 per cent. on the second income bonds.

Central New England.—The proposed 999-year lease, mentioned in the *Railway Age Gazette* of April 12, will cover only that portion of the New England Railroad situated in the state of New York, namely, about 29 miles of road extending from a point on the state line near Mill Plain, Conn., to Hopewell Junction, N. Y., on the Central New England.

Chicago, Indianapolis & Louisville.—This company has sold to Potter, Choate & Prentice and White, Weld & Co., both of New York, $1,558,000 refunding mortgage 5 per cent. bonds, series B, due July 1, 1947, which were held in the treasury. This is a closed mortgage and is a first and only lien on the entire 508 miles of line owned, at the rate of less than $30,000 per mile.

Chicago & North Western.—A deed was filed on April 2 in the office of the secretary of state of Wisconsin, transferring the Milwaukee, Sparta & North Western to the Chicago & North Western for a consideration of $1 and the assumption of the outstanding $15,000,000 first mortgage 4 per cent. bonds due March 1, 1947. For a description of the Milwaukee, Sparta & North Western see *Railway Age Gazette* of October 20, 1911, page 782.

Cincinnati, Hamilton & Dayton.—The Public Service Commission of Ohio has authorized the company to issue $1,559,000 5 per cent. bonds to be sold at not less than $80. These bonds are to be pledged to the Baltimore & Ohio, which is to advance 80 per cent. of the face value of the bonds, the entire sum to be used for improvements and new equipment.

Erie.—J. P. Morgan & Co., New York, are offering the $10,000,000 Erie 3-year 5 per cent. collateral notes dated April 1, 1912-1915 at 99¼ and interest, yielding over 5.27 per cent.

Hudson & Manhattan.—Walter G. Oakman and William M. Barnum have been elected directors to succeed A. N. Brady and W. H. Corbin.

Kansas City, Mexico & Orient.—The first mortgage bondholders' protective committee gives notice that the time for the deposit of bonds has been extended to April 30, thereafter subject to penalty. The protective committee of the International and Union Construction companies' stocks has similarly extended the time for deposit until May 4.

Missouri, Kansas & Texas.—This company will soon issue new securities. Directors are as yet undecided whether to dispose of $1,650,000 notes, the unsold balance of the $16,000,000 5 per cent. 2-year notes authorized in the last fiscal year, or to sell a portion of the $125,000,000 5 per cent. consolidated bonds authorized a year ago. The extent of financing will largely depend on the road's needs as determined by the inspection trip of the new executive officials.

The executive committee of this company now consists of James Campbell, W. S. Crandall, C. E. Schaff, Frank Trumbull, F. A. Vanderlip, J. N. Wallace and Hans Winterfeldt, of Speyer & Co., New York.

National Railways of Mexico.—This company, whose earnings are not given in our tables of roads reporting to the Interstate Commerce Commission, earned gross in February, 1912, $4,604,383, as against $5,025,832 in February, 1911. Operating expenses in 1912 were $2,992,531, and in 1911 were $3,308,694, leaving a net in February, 1912, of $1,611,853, as compared with $1,717,138 in 1911. For the eight months ended February 29, 1912, the company earned net $18,921,341, an increase over the same period in 1911 of $1,757,848.

New York & Harlem.—A committee has been formed to look after the rights of minority stockholders who are unwilling to accept the recent offer of the New York Central of $350, or $175 per $50 share for their stock. This committee consists of Henry Evans, president, Continental Insurance Co., chairman; E. F. Beddall, Graham F. Blandy, Albert W. Scholle and Edwin Thorne; John S. Sheppard, Jr., secretary.

Norfolk Southern.—Richard H. Swartwout, of Swartwout & Appenzellar, has been elected a director to succeed Oakleigh Thorne, resigned.

Quebec & Lake St. John.—A special meeting of the tsockholders of this company, which is controlled by the Canadian Northern, will be held at Quebec, April 30, to consider an agreement between the Quebec & Lake St. John, the Railway Share Trust & Agency Company, and the Canadian Northern regarding the exchange of certain issues of securities for certain new securities to be guaranteed by the Canadian Northern, and also to vote on the question of authorizing an issue of 4 per cent. perpetual consolidated debenture stock to be guaranteed by the Canadian Northern. The Quebec & Lake St. John runs from Quebec to Chicoutimi, 227 miles.

Rutland.—Application has been made for authority to issue equipment trust certificates for 1912. The trust agreement provides for the issuance of $500,000 certificates.

St. Louis & San Francisco.—This company has called for payment on June 1 $8,000,000 3-year 5 per cent. notes due March 1, 1913. These notes are secured by $10,000,000 New Orleans, Texas & Mexico division first mortgage 5 per cent. bonds, which have been sold, together with additional bonds amounting to $16,000,000 to William Salomon & Co. and G. H. Walker & Co. The proceeds of this sale will enable the company to pay off its notes, thereby liquidating the only large obligation maturing in the near future.

Milwaukee, Sparta & North Western.—See Chicago & North Western.

Terminal Railroad Association of St. Louis.—At the annual meeting of the stockholders, held at St. Louis on April 8, directors were elected as follows: A. A. Allen, Missouri, Kansas & Texas; F. H. Britton, St. Louis Southwestern; B. F. Bush, Missouri Pacific; George E. Evans, Louisville & Nashville; C. W. Galloway, Baltimore & Ohio Southwestern; Henry Miller, Wabash; Benjamin McKeen, Vandalia; F. W. Morse, Chicago & Alton; W. C. Nixon, St. Louis & San Francisco; E. J. Pearson, St. Louis, Iron Mountain & Southern; T. C. Powell, Southern; W. L. Park, Illinois Central; A. E. Sweet, Chicago, Rock Island & Pacific; C. E. Schaff, Cleveland, Chicago & St. Louis; Frank E. Ward, Chicago, Burlington & Quincy; W. S. McChesney, Jr., Terminal Railroad Association of St. Louis.

Toledo & Ohio Central.—William K. Vanderbilt, Jr., and D. C. Moon have been elected directors, succeeding C. E. Schaff and Horace E. Andrews, resigned.

Wabash.—Winslow S. Pierce, chairman of the Equitable Trust Co.-Kuhn, Loeb & Co. committee, for the protection of holders of the refunding mortgage bonds, says that about $14,000,000 bonds have already been deposited with the committee. Mr. Pierce is also quoted as saying that the committee has pledges of further deposits sufficient to constitute a majority of the total outstanding issue. It is understood that the committee, headed by James N. Wallace, president of the Central Trust Co., New York, has received deposits of $4,000,000 bonds. There are about $40,000,000 of these bonds authorized and about $35,000,000 outstanding.

Wheeling & Lake Erie.—The $4,190,000 receiver's certificates outstanding expire May 1. The court has granted a six months' extension to the present holders on the basis of 5 per cent. interest instead of 6 per cent. as formerly.